DUMONT
SWISSMADE

CARE & HANDLING BIO-MEDICAL INSTRUMENTS

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DUMONT SWISSMADE

CARE & HANDLING

BIO-MEDICAL INSTRUMENTS

MANUFACTURED WITH SURGICAL STEEL

1. PREPARATION FOR CLEANING

1.1 DECONTAMINATION

Immediately after use, rinse instruments under warm running water to remove all blood, body fluids and tissue. **It is best to remove soiling or other residues from your instruments as soon as possible, ideally immediately after use.** If not cleaned immediately after rinsing, instruments should be submerged in a solution of water and neutral pH (7) detergent until they can be cleaned. Please note that temperatures below 40° C are needed to avoid fixation of residual.

1.2 PROCESS CHEMICALS

Suitable pH-neutral or alkaline products added to cold or lukewarm water can be used for cleaning. Process chemicals used to reprocess medical instruments must be developed, tested and manufactured in Europe in accordance with the European Medical Devices Directive.

- Cleaners, neutralizers, rinsing and care agents are classified as class I medical products and are identified by the CE mark on the label.
- Process chemicals exerting a disinfecting effect are classified as class II a for the disinfection of medical products and class II b for the disinfection of invasive medical products. These are linked by a CE mark with a four-digit number identifying the responsible Notified Body.

Outside of Europe, the relevant national regulations must be observed.

Pretreatment agents

Pretreatment agents may be cleaning agents or anti-microbial products – e.g. bacteriostatic or disinfectant – which are applied prior to a manual or preferentially machine-based cleaning and disinfection procedure, for example as foam sprays, wet disposal products, etc.

Detergents

Using cleaning agents restricts contamination of a medical product to a degree necessary for further reprocessing or application. Cleaning agents are employed for both manual and automated cleaning and disinfection procedures. A basic distinction is made between:

- pH-neutral cleaning agents with/without enzymes,
- mildly alkaline cleaning agents with/without enzymes,
- alkaline detergents with/without tensides.

Neutralizers

Acidic substances based on citric acid or phosphoric acid which can be added to the initial rinsing water in machine-cleaning and disinfection following alkaline cleaning in order to neutralize alkalinity and enhance rinsing of the cleaning agent. Neutralizers may also be used to prevent spotting and support the formation of passive layers.

Rinse aids

Rinsing agents are added to the final rinsing water in a machine-based cleaning & disinfection procedure to achieve more effective, faster drying. The agents in the rinsing agents reduce the surface tension of the rinsing water and so minimize adhesive residual moisture.

Care products

Care products for surgical instruments with metallic friction surfaces which need oiling are made of paraffin oil (paraffinum perliquidum) and emulsifiers.

Always visually inspect cleaning results. As a rule, the instruments should be visibly clean after the cleaning stage. Cleaning steps should never be skipped, because residues on instruments may result in the formation of stains or deposits.

1.3 CHLORIDES ARE DANGEROUS

Never immerse stainless steel instruments in isotonic solution (such as physiological saline solution). Prolonged instrument contact with saline solution leads to pitting and stress corrosion cracking.

Please avoid soaking instruments overnight in any kind of cleaning solution because this could lead to rust and corrosion cracking. Also, disinfectants containing aldehyde should be avoided as they have a fixing effect.

Because of the corrosion risk and the cleaning factors, long intervals between instrument use and reprocessing (e.g. overnight or over the weekend) should be avoided. Field experience has shown that in the case of dry disposal, intervals of up to 6 hours pose no problem. Contamination and pre-cleaning are factors that have a critical impact here.

1.4 OBSERVE MATERIAL COMPATIBILITY

Material compatibility depends on the instrument material, the composition of the disinfectant, the temperature, the exposure time, the concentration, and the pH-value of the solution being used.

1.5 THE QUALITY OF WATER

Unfavorable water composition can have an adverse effect both on the reprocessing procedure and on the appearance of the instruments and materials. This is why water quality in sufficient quantity is already important when planning on-site plumbing installations. **Use correct water quality!**

The water constituents may cause the following problems:

WATER HARDNESS	Scaling, lime deposits due to calcium and magnesium salts, corrosion potential
HEAVY AND NONFERROUS METALS	Brown-red deposits, secondary rust
SILICATES, SILICIC ACID	White-grey, colored appearance, thin scaling
CHLORIDES	Pitting
EVAPORATION RESIDUE	Spotting and scaling

Also, apart from its natural constituents, drinking water sometimes contains rust, generally flushed from corroded pipework. During the reprocessing cycle this rust tends to adhere to instruments, causing rust spots (extraneous rust) and subsequent corrosion.

1.6 USE DEMINERALIZED WATER FOR FINAL RINSE

We recommend using demineralized water at the final rinse for the following reasons:

- No spotting,
- No increase in concentration of corrosive constituents, e.g. chlorides,
- No dried crystalline residues which could have a negative effect on the downstream sterilization process,
- Protection and stabilization of anodized aluminum surface.

To optimize the process and to achieve consistent quality of results, we recommend that you use fully demineralized water at all steps of the program.

1.7 THE FOLLOWING BASIC RULES SHOULD ALWAYS BE OBSERVED TO ENSURE GOOD CLEANING RESULTS:

- The items to be treated must be fully immersed in the liquid.
- Articulated instruments, scissors etc. must be opened in order to minimize the obscured surface areas. Insert instruments next to each other; do not stack them.
- If disinfection and cleaning are carried out simultaneously, make sure to use suitable products, paying attention to concentration and exposure time requirements.

1.8 MAINTENANCE

Always send medical products to the manufacturer for servicing as per the maintenance schedule.

Please note that instruments may be impaired if maintenance and use are operated outside use specifications or in a manner not specified by the manufacturer. **Dumont will not be held liable for damage resulting from improper use, incorrect or insufficient maintenance, incorrect handling, improper decontamination or cleaning procedures, the use of inappropriate accessories or spare parts and natural abrasion.**

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CARE & HANDLING

BIO-MEDIC INSTRUMENTS

MANUFACTURED WITH SURGICAL STEEL

2. MANUAL AND AUTOMATED CLEANING METHODS

2.1 ULTRASONIC CLEANING

Place instruments in open position into the ultrasonic cleaner. Make sure that instruments with sharp blades (*scissors, etc.*) do not touch other instruments. All instruments must be fully submerged. Do not place dissimilar metals (*stainless, copper, chrome plated, etc.*) in the same cleaning cycle. Instruments should be processed in the cleaner for **5 to 10 minutes**.

After ultrasonic cleaning, rinse instruments with demineralized water to remove ultrasonic cleaning solution.

2.2 AUTOMATIC WASHER STERILIZERS

Follow manufacturer's recommendations. Be sure to lubricate instruments after last rinse cycle and before sterilization cycle.

2.1.1 – STEAM STERILIZATION

Steam sterilization is performed with saturated steam, usually at 134 / 132 °C.

If validated steam sterilization processes are used in accordance with ISO 17665 (or DIN 58946 Part 7 in Germany) and all process-related parameters such as pressure, temperature and the proportion of non-condensible gases in steam are documented, it is possible to forgo chemoindicators or bioindicators for batch control, provided that the three parameters relevant to the procedure are consistently monitored. The sterilization steam used must be free of impurities and should not impair the sterilization process, nor should it damage the sterilizer or the items to be sterilized. To ensure this, the tolerances specified in EN 285, Table B.1, relating to the quality of the boiler feed water and the condensate may not be exceeded. Otherwise corrosion may result from contaminants, such as rust particles in the piping system, or discoloration caused by excessive silicic acid levels may appear on instrument surfaces. If the feed water contains large quantities of bicarbonate hardness, it increases the inert gas content of the sterilization steam and may adversely affect the sterilization result. **Damp or wet containers pose instrument corrosion hazards.** Poor and insufficient drying is frequently caused by the improper arrangement of loads, the use of less suitable types of non-woven fabrics for drying, and plastic dishes for instrument sets. In principal, heavy sieves should be placed at the lowest level, so that the majority of the accumulated condensate can drain off directly. Special drying measures must be adopted when validating items weighing more than 10 kg per sterilizing unit (30x30x60cm). In practice, residual moisture in the form of a few drops of water capable of evaporating within 15 minutes is tolerated, but actual pools of water are not acceptable! Even so, a few drops of water may cause some spotting. To prevent residual moisture altogether, consult the manufacturer of your sterilizer for relevant procedures.

2.1.2 – HOT-AIR STERILIZATION

Although hot air sterilization no longer represents the state of the art, it is still being used in isolated cases. If sterilization is still carried out with a hot air sterilizer, the following instructions continue to be effective and must be observed:

At temperatures above 185 °C, paraffin oil will resinify. This destroys its lubricating properties and thus impairs the instrument's function. If the specified temperature is significantly exceeded, there is a corrosion hazard as well as the risk of loss of hardness. Consequently, functionality is compromised, making instruments useless in many cases. Similarly, plastics may be adversely affected or even destroyed at higher temperatures. To ensure uniform heat distribution in the sterilization chamber, and thus in the items to be treated, the sterilizer loading instructions must be strictly observed!

2.1.3 – LOW-TEMPERATURE STERILIZATION

Low-temperature sterilization methods include gas sterilization and gas (plasma) sterilization. All these procedures work with chemical agents at temperatures between 37 and 75 °C.

For environmental reasons and in the interest of patient and personnel safety, **low-temperature sterilization methods should only be used for items that cannot be steam-sterilized!**

Items sterilized with ethylene oxide require adequate aeration following sterilization (and before reuse). Aeration times may vary considerably, depending on ventilation conditions and the product treated. For reliable aeration times, always consult the instrument manufacturer and/or observe the corresponding instructions.

2.3 MANUAL CLEANING

Ultrasonic cleaning is the most effective way to clean instruments, especially those with hinges, locks and moving parts. If ultrasonic cleaning is not available, follow these steps:

- Use stiff plastic cleaning brushes. Do not use steel wool or wire brushes.
- Use only neutral pH (7) detergents (low pH detergents, if not rinsed off properly, will cause breakdown of stainless protective surface and black staining; high pH detergents will cause surface deposit of brown stain, which will also interfere with smooth operation of the instrument).
- Brush delicate instruments carefully and, if possible, handle them separately from general instruments.
- Make sure all instrument surfaces are visibly clean and free from stains and tissue. Inspect each instrument for proper function and condition. Make sure that scissor blades glide smoothly all the way (*blades must not be loose when in closed position*). Check that forceps tips are properly aligned. Examine cutting instruments and knives to be sure their blades are sharp and undamaged.
- After scrubbing, rinse instruments thoroughly under running water.

3. WHY WE RECOMMEND ULTRASONIC CLEANING:

- Is an effective mechanical method supporting manual cleaning processes.
- Removes stubborn residues.
- Is an integral part of machine-based reprocessing treatments, thus supporting other measures for improved cleaning results.

3.1 TO SECURE OPTIMAL CLEANING RESULTS WHEN USING ULTRASOUND, OBSERVE THE FOLLOWING:

- Fill the bath in accordance with the manufacturer's instructions.
- Use only suitable trays (e.g. wire or perforated plate trays) that do not obstruct the ultrasonic cleaning process.
- Do not overload trays.
- Large-surface, bulky instruments must be placed so that they do not create acoustic shadows. Such items should be placed vertically.
- Ultrasonic baths should be refilled each day. Disinfectant solutions can have long lives provided they are duly certified, taking care to observe national guidelines as well as manufacturer specifications. As high contamination levels impair ultrasonic cleaning and promote corrosion, more frequent replacement of the ultrasound solution may be necessary, depending on the requirements of specific cases.
- Add a suitable cleaning agent or a combined cleaner-disinfectant.
- When using both disinfectant and cleaning agents, the concentration, temperature and ultrasound treatment/exposure time must be chosen in accordance with the manufacturer's instructions to ensure compatibility.
- Freshly prepared disinfectant or cleaning solutions require degassing before their first use.
- We recommend filling the bath with water at room temperature.
- Given powerful equipment, ultrasonic treatment times of approx. 3 minutes at frequencies of around 35 kHz should be sufficient.
- Water temperatures above 45°C can lead to encrustations due to protein denaturation.
- The efficacy of the ultrasonic bath can be verified by the foil test to IEC/TR 60886: 1987. Upon completion of the test, the ultrasonic bath should be thoroughly rinsed in order to prevent dissolved aluminum particles from being deposited on instruments.

4. COMMON CAUSES OF SURFACE CHANGES

4.1 ORGANIC RESIDUES

Rust and/or blood-colored deposits can often be seen. We recommend to adequately rinse in cold water your tools to proceed with proper sterilization to remove blood stains and avoid hygiene risk of infection as well as corrosion (even with stainless steel) because blood contains chloride ions. If present in higher concentrations, these ions cause pitting and/or stress-crack corrosion.

Origin and causes:

- Blood residues in the closed joint area because instrument was closed for cleaning.
- Dry residue because the interval between use and reprocessing is too long.
- Protein fixing, e.g. by disinfectants containing aldehyde.
- Transferred by contaminated cleaning agents and disinfectants.
- Insufficient rinsing after cleaning.
- Insufficient cleaning efficiency due to acoustic shadows in ultrasonic cleaning.
- Inadequate maintenance of the washer/disinfector.
- Possible protein fixing caused by excessive water feed temperature (> 50 °C) in first rinsing phase.
- Ineffective rinsing (insufficient water flow through or around the instruments, insufficient rinse pressure, spray shadows).
- Insufficient cleaning efficiency due to foam formation, for example due to high amounts of blood or cleaning agent and disinfectant residues carried over from the ultrasonic or immersion bath.
- Improper loading due to use of wrong instrument trolley/trays or overloading.
- Insufficient cleaning efficiency, because the instruments/devices were not open and/or badly positioned.

How to solve:

- Recleaning with ultrasound.
- Targeted manual recleaning.
- Immersion in 3 % H2O2solution (approx. 5 min.).

4.2 PROCESS CHEMICAL RESIDUES

Depending on the extent of the residues, instrument type, and surface condition, bright to dark gray deposits / discoloration may appear in various sizes. This may become even more apparent following sterilization. Ensure sufficient intermediate and/or final rinsing with fully demineralized water or correct the loading to avoid patients could be exposed to risk of chemical burns caused by alkali and surfactant residues.

Origin and causes:

Process chemicals that have not been removed sufficiently (spray shadows, incorrect loading) during the intermediate and/or final rinses.

How to solve:

- Wipe off with a low-lint cloth.
- Acid-based cleaning with special cleaning agents.

4.3 SPOTTING CAUSED BY LIME

These appear as stains/discolorations of a milky white to gray color. Depending on specific conditions, these changes may extend across a larger surface or take the form of irregular spots with sharply defined borders, distributed across the instrument's surface (and/or the washer/disinfector's internal surfaces). If not fixed, the risk is that corrosion may develop as a result. Use fully demineralized water for the final rinse to prevent stain formation during machine-based reprocessing.

Origin and causes:

Excessive lime in the water used for the cleaning stage or at the final rinse.

How to solve:

- Wipe off with a low-lint cloth.
- Acid-based cleaning with special cleaning agents.

4.4 DISCOLORATION CAUSED BY TITANIUM OXIDE OR SILICATES

Discoloration caused by silicates occurs occasionally during instrument reprocessing in the form of titanium oxide, more frequently in the form of silicic acid. Such discoloration is especially visible on new and repaired instruments, storage systems, washers/disinfectors and sterilization chambers.

The severity of the discoloration is in part dependent on the surface finish, any deposits of metal ions (e.g. copper from fittings or the pipe system), the weight and the positioning of the instruments. Use silicic acid-free, fully demineralized water for the final rinsing during machine-based reprocessing.

Origin and causes:

- Silicate discoloration: During the production of fully demineralized water, silicic acid is passed as a result of the use of ion exchangers and reverse-osmosis water reprocessing equipment.
- Silicate discoloration: Silicate-based cleaning agents are carried over into the final rinse process of machine-based reprocessing due to insufficient intermediate rinsing or dried cleaning agent solution deposits.
- Silicate discoloration: Increased concentration of silicates in steam generators, which is carried over to the sterilization steam.
- Titanium oxide discoloration: Silicate-based cleaning agents containing small (trace) quantities of titanium oxide compounds as a substance present naturally in the silicates are carried over in the final rinse process due to inadequate intermediate rinsing or dried cleaning agent solution deposits.

How to solve:

- Silicate deposits can be removed by means of acid-based cleaning using special cleaning agents as recommended by the manufacturer. Stubborn deposits can be removed with agents containing hydrofluoric acid.
- Titanium oxides are especially stubborn and cannot be removed (or at best, cannot be removed completely) using common acid-based cleaning processes.
- Have the surface mechanically treated by the manufacturer or a qualified repair service.

4.5 OXIDATION

A shiny, gray-black passive chromium oxide layer is only formed in the case of hardenable non-stainless steels, frequently initially identifiable with cutting instruments (e.g. scissors), but also in the case of non-cutting instruments (e.g. forceps, thumb forceps).

In the case of titanium materials surface discoloration may be formed with uniform varying coloration (e.g. gray, blue, violet, red, golden yellow, green) or with blotchy multicolor discoloration.

Origin and causes:

In the case of the above stainless steels, the passive layer is formed during automated cleaning as a result of the neutralizer carried during the final rinsing and/or by other as-yet unidentified factors forming passive layers. Passive layers may be transparent (is usual) to black in the case of stainless steels, depending on the composition, density and thickness. The tendency to form gray-black chromium oxide passive layers depends, in particular, on the ratio of chromium content/carbon content, alongside the influences of the material composition referred to above. In practice, this means that the higher the carbon content, the faster a gray-black discoloration may become visible.

In the case of titanium materials, damp heat and/or cleaning chemicals used in the various reprocessing stages may lead to oxidation of the surface and hence to discoloration of the surface.

Titanium oxide deposits may be transparent or multicolored/colored depending on the composition, density, and thickness.

How to solve:

Repair of the damage by the user is not recommended due to the properties of the deposit, but may be carried out by the manufacturer or a qualified repair service if necessary. In both cases, appropriate surface treatment is required (mechanical in the case of steel, chemical in the case of titanium). In the case of stainless steels, removing the deposit with a basic cleaning agent has no effect on account of significantly increased resistance to corrosion.

CARE & HANDLING

4.6 PITTING

Pinprick-like corrosion holes in stainless steel, frequently microscopically small, surrounded by sparkling, reddish-brown or multi-colored corrosion spots, often associated with circular corrosion deposits around the corrosion hole.

Corroded instruments should be immediately withdrawn from service in the interest of user safety, corrosion holes can pose a hygienic hazard and may lead to stress-corrosion cracking as well.

Origin and causes:

- In stainless steel this is caused by exposure to halide ions (bromides, iodides and chlorides), but especially chlorides, that locally break through the passive layer of instrument steel, thus causing pitting.
- Dried-on organic residues, e.g. blood, pus, secretions.
- Frequent pitting is due to the use of liquids with a high chloride content, or more specifically, due to dry residues of such liquids adhering to the instrument surfaces, e.g. if the concentration of chlorides in the final rinse water is too high or if residues of physiological salt solutions remain on the instruments.
- Brand new instruments are particularly susceptible to attack by media containing chlorides due to their still-thin passive layer. Instruments that have been in use for some time are more resistant to chloride attack because they have developed a thicker passive layer.

How to solve:

- Chloride-induced pitting can be largely prevented by using low-chloride water qualities, by minimizing organic residues or other effects of chloride- containing liquids, such as physiological saline solution on instrument steel.
- Corrosion by-products can be dissolved with an acid-based cleaning agent used in accordance with the manufacturer's specifications. The remaining corrosion holes may be treated mechanically (reworking by the manufacturer). If pitting is deeper, long-term repair is often no longer possible. The instrument must be replaced.

4.7 WEAR FRICTION CORROSION

Brown stains/discolorations or rust formation around an area that has been chafed.

Origin and causes:

- Insufficient lubrication and/or foreign bodies lead to corrosion of the metallic friction surfaces/instrument components that move relative to each other (especially in ends/joints and sliding rails, e.g. with punches). This forms micro-abrasion, which can make the surface extremely rough and destroys the passive layer. In these sensitized areas, humidity or deposits (e.g. blood residues) can easily accumulate - a process that usually leads to corrosion.

How to solve:

- Discard defective instruments or have them repaired where possible.
- Regrinding and/or polishing can usually repair corrosion damage.
- Repeated reworking affects the handling/controllability and thus the functionality of the instrument, making it useless.
- Allow the instruments to cool down to room temperature.
- Accurately applying care products to the instrument prior to performing the functional check.

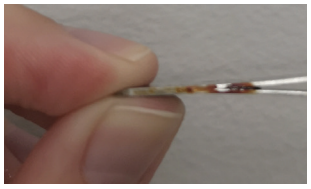
4.8 SURFACE CORROSION OF STAINLESS STEELS

On stainless steel mostly a uniform, flat-gray surface attack that quite often leads to subsequent damage in the form of corrosive deposits.

Origin and causes:

Chemical and electrochemical effects only in connection with an excessive acid content with:

- Stainless steel,
- Soldering points,
- Long-term impact of water/condensate in the case of stainless steel.



How to solve:

- Rust removal by means of acid-based cleaning in the case of stainless steel if the damage is still superficial and/or mechanical treatment of soldering points (if appropriate) by the instrument manufacturer.
- If sintered carbide (TC/CO) surfaces are affected, the damage is irreparable.
- In the case of soldered instruments, always observe the application recommendations when using acid cleaners and neutralizers.
- Avoid long-term exposure to moisture (condensate).

The following staining chart may help to detect the cause of surface changes:

STAIN COLOR	CAUSE
Black	Exposure to ammonia, High pH in detergents
Bluish/Black	Reverse plating due to mixed metals during cleaning process
Brown/Orange	Dried blood or debris, High-alkaline detergents
Dark Brown	Low pH in detergents
Grey	Excessive use of rust remover solution
Light/Dark Spots	Water droplets drying on the surface, Steam impurities, Residual detergents
Multicolor	Excessive heat or hot spots in the autoclave
Pitting	Exposure to saline solutions, blood, debris, improper chemicals, damage
Rust	Dried-on soil, contact with barbicides, improper drying and storage, High-alkaline detergents

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HARDNESS OF **ALLOYS**

Below Dumont's alloys in order of hardness, useful for determining which alloy will resist scratching and dinging, as it relates to the Rockwell C scale and ductility.

hardest +

NON-AUTOCLAVABLE POOR TEMPERATURE RESISTANCE MAGNETIC RUST	**CARBON [01]** > 59 HRC	**Carbon Steel** is an extremely hard alloy with carbon content up to 2.1% by weight, Mn, and Si. This alloy is magnetic and cannot be sterilized.
AUTOCLAVABLE 180°C TEMPERATURE RESISTANCE 400°C ANTIMAGNETIC 100% NEVER RUST	**DUMOSTAR® [09]** > 58 HRC	**Dumostar®** is a patented alloy more elastic and resistant to corrosion than the best stainless steels. It is also perfectly compatible with human tissues and is resistant to mineral and organic acids as well to salt. It is 100% antimagnetic and resistant to temperatures of up to 400°C. It's sterilizable and autoclavable. Dumostar® is the most cost effective and appropriate alloy for laboratory use.
AUTOCLAVABLE 180°C TEMPERATURE RESISTANCE 400°C MAGNETIC NEVER RUST	**INOX 08 [08]** 58 HRC	**Inox 08** is a medical stainless steel that provides an excellent resistance to corrosion and a good resistance to salt. This magnetic alloy supports temperatures of around 400°C (DIN 50914*) and is suitable for autoclave sterilization at 180°C.
NON-AUTOCLAVABLE TEMPERATURE RESISTANCE 400°C MAGNETIC NEVER RUST	**INOX 02 [02]** 55 – 58 HRC	**Inox 02** is a magnetic stainless steel high in chromium content that forms an invisible layer on the steel to prevent corrosion and staining. Inox 02 resists temperatures of around 400°C (DIN 50914*), but to preserve the tools we suggest not to sterilize in autoclave.
AUTOCLAVABLE 132°C TEMPERATURE RESISTANCE 400°C ANTIMAGNETIC 80% NEVER RUST	**ANTIMAGNETIC [04]** 37 HRC	**Antimagnetic** offers a good resistance to corrosion thanks to its high concentration of molybdenum. Is resistant up to temperatures of around 400°C (DIN 50914*) and is suitable for autoclave sterilization at 132°C.
AUTOCLAVABLE 132°C TEMPERATURE RESISTANCE 400°C ANTIMAGNETIC 95% NEVER RUST	**DUMOXEL® [03]** ~ 37 HRC	**Dumoxel®** was developed and patented to offer the best in resistance to corrosion thanks to its high concentration of molybdenum and chromium. It also guarantees an excellent resistance to sulphuric environments, hydrochloric acid, as well as to all other mineral and organic acids. Is 95% antimagnetic, resistant up to temperatures of around 400°C (DIN 50914*) and is suitable for autoclave sterilization at 132°C.
NON-AUTOCLAVABLE POOR TEMPERATURE RESISTANCE ANTIMAGNETIC 100% NEVER RUST	**NICKEL [05]** ~ 15 HRC	**Nickel** is a 100% antimagnetic alloy composed of Cu, Ni, Mn and Zn. It is widely appreciated as it does not damage the components handled by it.
NON-AUTOCLAVABLE POOR TEMPERATURE RESISTANCE ANTIMAGNETIC 100% RUST	**BRASS [06]** 5 – 10 HRC	**Brass** is composed of Cu, Pb, Sn, Ni and Zn. This alloy is 100% antimagnetic and is widely used for handling delicate components, especially in watch-making.
NON-AUTOCLAVABLE POOR TEMPERATURE RESISTANCE ANTIMAGNETIC 100% RUST	**BRONZE [010]** ~ 5 HRC	**Bronze** is a nonferrous alloy widely popular in watchmaking for handling scratch-sensitive parts against damage. It is completely anti-magnetic and resistant to corrosion.
AUTOCLAVABLE 132°C TEMPERATURE RESISTANCE 430°C ANTIMAGNETIC 100% NEVER RUST	**TITANIUM [07]** < 1 HRC	**Titanium** is totally resistant to corrosion from nitric acid, chloride, salt water, and the like. This alloy is not as hard as Inox 08 but is 40% lighter and more flexible. Titanium is 100% antimagnetic and resistant up to temperatures of around 430°C and is suitable for autoclave sterilization at 132°C.

** DIN 50914 : Determination of the resistance of stainless steel to intergranular corrosion using the copper sulfate sulfuric acid method (Moneypenny-Strauss Test)*

least hard —

DUMONT SWISSMADE

DATA SHEET

CARBON

RECOMMENDED USE

Frequently used for:

- **WATCHMAKING AND ELECTRONICS** because of the the exceptional performance of carbon alloys that give the tweezers an unparalleled strength together with a very light weight.
- **BIO-MEDICAL** not very common in the medical field due to impossibility to sterilize it, it's however used for the production of a small number of lab tools.

DESCRIPTION

Carbon steel is an alloy of C, Mn and Si. It is a very hard material (>59 HRC) that is used to make very hard tips. Carbon steel is magnetic and susceptible to rust and as such cannot be sterilised.

CLEANING REMINDER

DETERGENTS AND SURFACTANTS

✓

ALCOHOLS

✓

ALWAYS DRY CAREFULLY TO PREVENT RUST

✓

NON STERILIZABLE OR AUTOCLAVABLE

✗

CHEMICALS AND BLEACH*

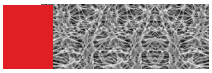
✗

*Bleach, bleach-based products, anti-bac cleaners and sanitizer sprays may all contain chemicals which are harmful to carbon steel and may cause irreparable damage.

POLISHED FINISH

Polished is our standard finish which gives a pleasant smooth and silky sensation while handling.

EPOXY COATING



Epoxy coating uses polymers in the coating application to enhance corrosion resistance, and it's available in several colors.

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DUMOSTAR®

RECOMMENDED USE

Frequently used for:

- **BIO-MEDICAL** the ductility of this material allows the creation of high performance instruments that combine extremely fine tips (suitable for microscope operations but also for handling nerves or other adhesive tissues) with very solid bodies, in an alloy resistant to high temperatures, therefore sterilizable and autoclavable.
- **WATCHMAKING AND ELECTRONICS** for the various features that this alloy gives to precision instruments, such as high resistance combined with extraordinary lightness, essential for tools held for a long time.

DESCRIPTION

Dumostar® is composed of C, Cr, Mo, Mn, Co, Ni and Si. Dumostar is more elastic and more resistant to corrosion than the best stainless steels. It is also perfectly compatible with human tissues and is resistant to mineral and organic acids as well to salt. Although slightly more expensive than other alloys, Dumostar is 100% antimagnetic, the temperature resistance range is from cryogenic until maximum 500°C. This is the most cost effective and appropriate alloy for laboratory use.

CLEANING REMINDER

CHLORINATED OR NON CHLORINATED SOLVENTS
✓

DETERGENTS AND SURFACTANTS
✓

ALCOHOLS
✓

STERILIZABLE AND AUTOCLAVABLE AT 180°C
✓

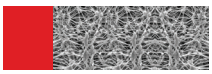
MATT FINISH

Matt finish combine at the same time a **non reflecting surface**, perfect to work under magnifier working lights, and the **perfect grip** to ensure better handling.

POLISHED FINISH

Polished is our standard finish which gives a pleasant smooth and silky sensation while handling.

TEFLON COATING



Teflon® coating is a type of polymer coating that uses the synthetic fluoropolymer known as Polytetrafluoroethylene (PTFE) to reduce friction and increase heat resistance.

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INOX 08

RECOMMENDED USE

Frequently used for:

- **BIO-MEDICAL** the ductility of this material allows the creation of high performance instruments that combine extremely fine tips (suitable for microscope operations but also for handling nerves or other adhesive tissues) with very solid bodies, in an alloy resistant to high temperatures, therefore sterilizable and autoclavable.
- **WATCHMAKING** for the various features that this alloy gives to precision instruments, such as high resistance combined with extraordinary lightness, essential for tools held for a long time.
- **COSMETIC AND BEAUTY** because of the high biocompatibility of the material and the possibility to sterilize tools with multiple products which guarantee the highest level of hygiene and practicality for a daily use.

DESCRIPTION

Inox 08 is a medical-grade alloy made up of C, Mn, Cr, Mo and V that offers excellent resistance to corrosion and salt. It is softer than Carbon steel and offers excellent stainless qualities. Inox is a magnetic alloy that can withstand temperatures of up to approximately 400°C (DIN 50914*) and is suitable for autoclave sterilization at 180°C.

CLEANING REMINDER

CHLORINATED OR NON CHLORINATED SOLVENTS

✓

DETERGENTS AND SURFACTANTS

✓

ALCOHOLS

✓

STERILIZABLE AND AUTOCLAVABLE AT 180°C

✓

CHEMICALS AND BLEACH*

✗

*Bleach, bleach-based products, anti-bac cleaners and sanitizer sprays may all contain chemicals which are harmful to stainless steel and may cause irreparable damage.

** DIN 50914 : Determination of the resistance of stainless steel to intergranular corrosion using the copper sulfate sulfuric acid method (Moneypenny-Strauss Test)*

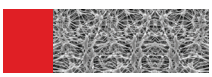
MATT FINISH

Matt finish combine at the same time a **non reflecting surface**, perfect to work under magnifier working lights, and the **perfect grip** to ensure better handling.

POLISHED FINISH

Polished is our standard finish which gives a pleasant smooth and silky sensation while handling.

EPOXY OR TEFLON COATINGS



Teflon® coating is a type of polymer coating that uses the synthetic fluoropolymer known as Polytetrafluoroethylene (PTFE) to reduce friction and increase heat resistance. Epoxy coating uses polymers in the coating application to enhance corrosion resistance, and it's available in several colors.

DUMONT SWISSMADE

DATA SHEET

INOX 02

RECOMMENDED USE

Almost as strong as carbon steel, Inox is an excellent general-purpose alloy frequently used for:

- **BIO-MEDICAL** combining reasonable ductility with extreme resistance enables precise and long-lasting tools to be produced.
- **WATCHMAKING** for the various features that this alloy gives to precision instruments, such as high resistance combined with extraordinary lightness, essential for tools held for a long time.
- **COSMETIC AND BEAUTY** because of the high biocompatibility of the material and its high resistance combined with extraordinary lightness which guarantee hygiene and practicality for a daily use.

DESCRIPTION

Inox 02 is standard stainless steel made up of C, Mn, Cr and Si. The presence of chromium in Inox 02 makes it softer than carbon steel. Inox 02 is a magnetic alloy and can withstand temperatures of up to approximately 400°C (DIN 50914*), but cannot be sterilised.

CLEANING REMINDER

CHLORINATED OR NON CHLORINATED SOLVENTS

✓

DETERGENTS AND SURFACTANTS

✓

ALCOHOLS

✓

NON STERILIZABLE OR AUTOCLAVABLE

✗

CHEMICALS AND BLEACH*

✗

*Bleach, bleach-based products, anti-bac cleaners and sanitizer sprays may all contain chemicals which are harmful to stainless steel and may cause irreparable damage.

** DIN 50914 : Determination of the resistance of stainless steel to intergranular corrosion using the copper sulfate sulfuric acid method (Moneypenny-Strauss Test)*

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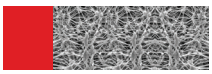
EPOXY OR TEFLON COATINGS



Teflon® coating is a type of polymer coating that uses the synthetic fluoropolymer known as Polytetrafluoroethylene (PTFE) to reduce friction and increase heat resistance. Epoxy coating uses polymers in the coating application to enhance corrosion resistance, and it's available in several colors.

DUMONT SWISSMADE

DATA SHEET

DUMOXEL®

RECOMMENDED USE

Frequently used for:

- **BIO-MEDICAL** the ductility of this material allows the creation of high performance instruments that combine extremely fine tips (suitable for microscope operations but also for handling nerves or other adhesive tissues) with very solid bodies, in an alloy resistant to high temperatures, therefore sterilizable and autoclavable.
- **WATCHMAKING AND ELECTRONICS** for the various features that this alloy gives to precision instruments, such as high resistance combined with extraordinary lightness, essential for tools held for a long time.

DESCRIPTION

Dumoxel® is composed of C, Cr, Ni, Mo and Cu and is the most popular alloy among our customers. This alloy has been developed and patented to offer the best in resistance to corrosion thanks to its high concentration of molybdenum and chromium. Dumoxel also guarantees an excellent resistance to sulphuric environments, hydrochloric acid, as well as to all other mineral and organic acids. Dumoxel is 95% antimagnetic, resistant up to temperatures of around 400° C (DIN 50914*) and is suitable for autoclave sterilization at 132°C.

CLEANING REMINDER

CHLORINATED OR NON CHLORINATED SOLVENTS ✓

DETERGENTS AND SURFACTANTS ✓

ALCOHOLS ✓

STERILIZABLE AND AUTOCLAVABLE AT 132°C ✓

** DIN 50914 : Determination of the resistance of stainless steel to intergranular corrosion using the copper sulfate sulfuric acid method (Moneypenny-Strauss Test)*

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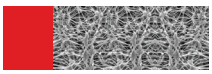
TEFLON COATING



Teflon® coating is a type of polymer coating that uses the synthetic fluoropolymer known as Polytetrafluoroethylene (PTFE) to reduce friction and increase heat resistance.

DUMONT SWISSMADE

DATA SHEET

TITANIUM

RECOMMENDED USE

Frequently used for:

- Being extremely light and at the same time resistant to a large number of chemicals as well as high temperatures makes titanium an extremely versatile material, suitable for any need.

DESCRIPTION

Titanium is an alloy composed of C, Fe, O, H, N and Ti. It is totally resistant to corrosion from nitric acid, chloride, salt water, and the like. This alloy is not as hard as Inox 08 but is 40% lighter and more flexible. Titanium 100% antimagnetic and resistant up to temperatures of around 430°C.

CLEANING REMINDER

CHLORINATED OR NON CHLORINATED SOLVENTS ✓

DETERGENTS AND SURFACTANTS ✓

ALCOHOLS ✓

STERILIZABLE AND AUTOCLAVABLE AT 132°C ✓

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