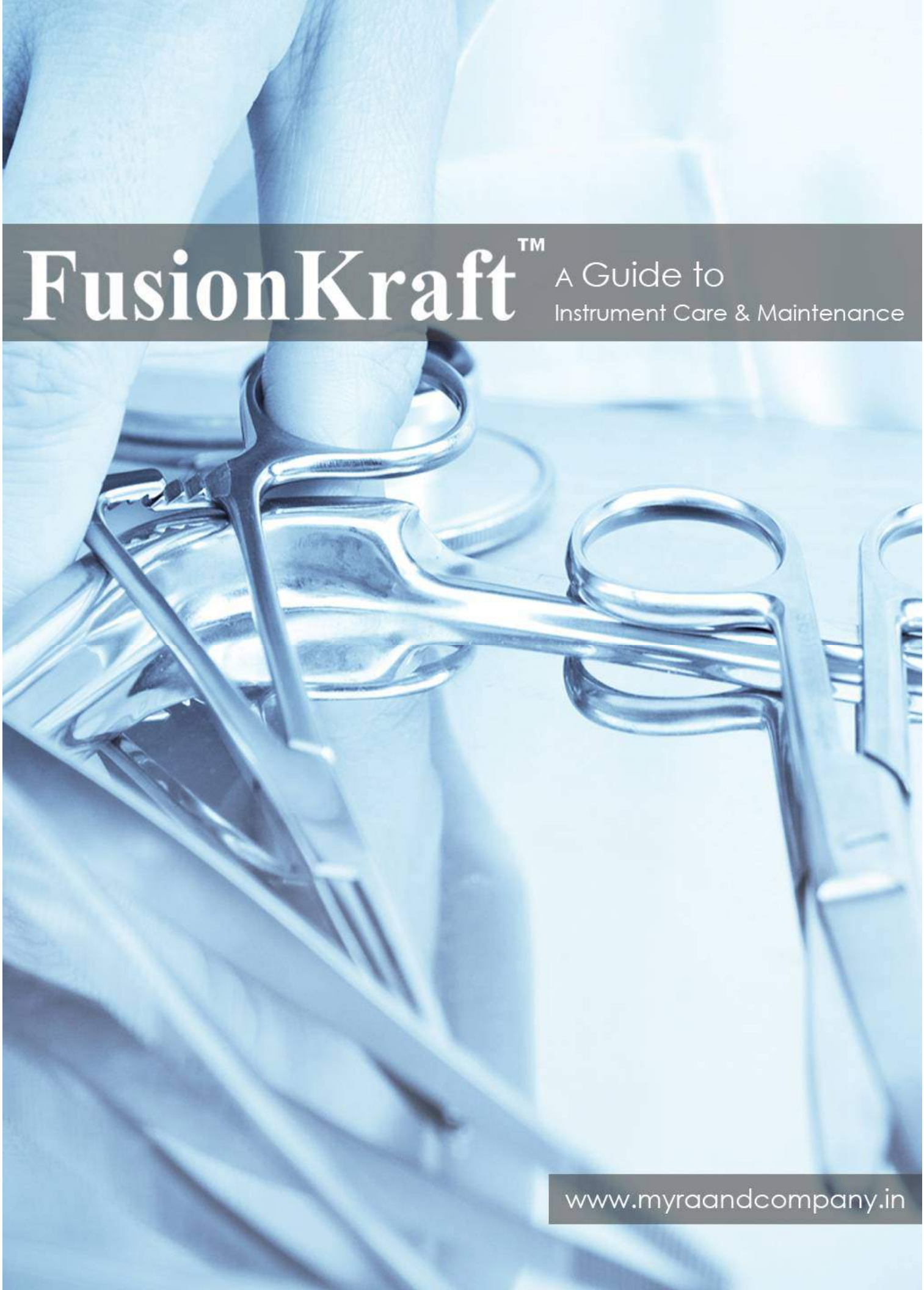

FusionKraft™

A Guide to
Instrument Care & Maintenance

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Myra & Co.

launches

FusionKraft™

General Vascular

Ophthalmic

Neuro

Plastic

Micro

Cardiac

Thoracic

ENT Gynaecology

Orthopaedics

Introduction

Instruments represent a significant material asset within the overall investment of a hospital. The care and maintenance these instruments receive is critical to their performance during surgery and to the cost containment efforts of each hospital authority. Having made the investment in a quality product, the authority can expect an extended period of trouble free use if the operator utilizes proper techniques during use, care, and handling of its surgical instruments.

This literature is designed to help prolong the functional capability and value of FusionKraft™ surgical instruments and should be used in conjunction with the individual hospital policy for cleaning and sterilizing. In an effort to reduce the cost and expenses associated with surgical instruments, many hospitals are finding that prevention is better than cure. As a result, more and more healthcare institutions are developing specific standards and programs for proper instrument maintenance and care.

An understanding of the materials used to manufacture FusionKraft™ instruments, and its characteristics, coupled together with a sound knowledge regarding correct reprocessing procedures will result in a trouble free, long lasting life for your FusionKraft™ surgical instruments.

The Myth about Stainless Steel

Around 75% of all surgical instruments used today are made of stainless steel. It resists rust, is able to be honed to a fine point and retains sharp edges. Unfortunately the term “stainless” steel is frequently taken too literally. There is really no *“stainless”* type of steel. During the manufacturing process a step known as passivation actually provides the instrument with its corrosion resistance properties. Passivation, which follows the final polishing steps, is a chemical bath that creates an oxidised layer on the surface of the instrument. Through routine hospital use and exposure to the air this oxidation process continues, effectively maintaining and even building up a barrier to most stains and corrosive elements. Hence the term – *Stainless Steel*

Materials

Stainless Steel:

The steel used in most surgical instruments is an alloy that has several useful properties. It can be brought to a very sharp cutting edge and will hold this edge through continuous use. It has a high tensile strength enabling it to maintain precisely set jaw approximations. The metal is often referred to as stainless because of its corrosion resistance qualities. Chromium content of approximately 11.5% - 18% gives the steel some of its stainless characteristics and the desired percentage of carbon imparts it the hardness required for maintaining sharp edges on instruments.

The stainless steels used in the manufacture of surgical instruments can be divided into two main classes.

Austenitic (Non-magnetic)
Martensitic (Magnetic)

Austenitic stainless is used in the manufacture of instrument where hardness is not important. It contains less carbon steel and so is less susceptible to corrosion and staining.

Martensitic stainless is used for the majority of instrument manufacture. i.e. scissors, forceps, retractor blades etc. These can be hardened by heat treatment to give strength and durability to the instrument. All FusionKraft™ instruments are provided with a *matte* or *satin* finish to ensure non-reflective properties during complex surgical interventions.

Quality Control & Standards:

The stainless used in the manufacture of FusionKraft™ instruments meet the established global specifications. Throughout the manufacturing process the FusionKraft™ instruments undergo many rigorous quality assurance tests.

All forgings are inspected to ensure dimensional accuracy and that correct annealing has been achieved. Annealing is a process that brings the raw forging to the correct hardness for machinability and also to minimise the grain size which enables better surface finishing of the instrument. This process is

achieved by heat treatment bringing the forging to a correct temperature for a specific time usually within a vacuum furnace.

All instruments made from Martensitic stainless are heat treated and hardened by the vacuum process. Once hardened each batch is random tested for correct harness requirements.

Once the instruments have passed the final inspection stage they are then etched with our brand name - FusionKraft™, cleaned to remove all final traces of manufacturing and polishing debris and finally lubricated as necessary.

All our processes adhere to the stringent criteria laid down under ISO 9001 : 2008 Quality Certification System.

FusionKraft™ instruments are manufactured by highly skilled craftsmen who strive to produce reliable, durable instruments that surpass all expectations. We believe our adherence to stringent manufacturing and Quality Assurance procedures coupled with the use of high-grade conforming materials ensure that any instrument bearing the **FusionKraft™** name will meet the demand of even the most discerning operator.

Comprehensive FusionKraft™ Instrument Care Programme

A simple four-step solution to ensure effective care to FusionKraft™ instrument is:

1. CLEAN & DISINFECT
2. LUBRICATE
3. INSPECT
4. STERILIZE

1. Cleaning & Disinfection

Disinfection of soiled instruments not only helps to preserve the instruments themselves but also serves to protect the persons responsible for their transportation and cleaning. Wherever possible, instruments should be disinfected and cleaned immediately after use. Any soiling left to dry will make eventual cleaning far more difficult and could result in damage to the

Pitting

instrument. Caustic agent and medicines e.g. iodin e preparations, silver nitrate, mercury and solutions high in chlorides can be used in operating rooms and other medical procedures. These agents are highly corrosive and should be removed as soon as possible from the surface of the instrument. Under no circumstances should instruments be over exposed or stored in any physiological saline solution as prolonged contact causes pitting and rust.

If manual handling of instruments to be cleaned and disinfected has to be carried out then the instructions of the chemical manufacturer must be strictly adhered to regarding concentration, temperature and exposure time. Special attention should be paid to the manufacturer's instructions regarding compatibility of materials such as anodised aluminium otherwise corrosion of surfaces of the anodised item would occur.

Always use fresh disinfecting and cleaning solutions as directed. Prolonged use of the same solution may cause:

- corrosion due to soiling
- corrosion due to increasing concentration of chemical caused by evaporation
- decrease in the effectiveness of disinfection agent due to excessive level of soiling

Powdered disinfecting products must be completely dissolved prior to immersing any instruments since un-dissolved particles may lead to clogging of narrow lumens and box locks and to discolouration of the instrument surface.

Discolouration

Following manual chemical disinfection, instruments must be thoroughly rinsed in fresh running water to remove all residues. No metal brushes or scourers should be used. The final rinse should be in distilled or demineralised water to reduce the risk of water spots and finally, instruments should be thoroughly dried.

Machine cleaning and disinfection is usually carried out by the CSSD when the instruments are received for reprocessing in a dry state. If they need to be transported in a wet state then a low foaming chemical must be employed as high foam levels can influence the effectiveness of cleaning.

The temperature of the inflowing water must never exceed 45°C as higher temperatures lead to protein coagulation.

Again, the manufacturer's instructions as to the concentration, temperature and exposure time, of the cleaning or disinfection agent must be strictly adhered to. The popular belief of thinking that the more chemical is used then the more effective it must be should be immediately dispelled!

Using the correct dosage not only guarantees a proper disinfection and cleaning result but also protects the material of the instrument against excess alkaline or acidic pH levels. Corrosion and pitting can occur with imbalanced pH values.

When machine washing, special attention should be paid to the following:

- hinged instruments must always be open to allow thorough cleaning of the joints,
- ensure that cleaning trays/baskets are not overloaded,
- any instruments with lumens must be placed so as to allow through flow of cleaning agents and rinse water,
- place large instruments in such a way as to avoid '*shadowing*' of other instruments,
- ensure dissimilar metals are not in contact with each other which can cause contact corrosions.

The rinse cycle phase is very important. Any debris washed off the instruments must be removed from the final rinse otherwise spotting and discolouration may occur. The use of demineralised water in the final rinse stage shall help avoid the same. Immediate drying, whether by machine or other means, is essential to avoid further spotting and possible corrosion occurring due to evaporation of water on the surface of the instrument.

2. Lubrication

Even the most careful cleaning can sometimes still leave an instrument stiff or hard to work. Even if all blood and debris have been removed, mineral deposits and other impurities from the water system can collect on the instrument and may cause staining, rusting and corrosion.

Fretting Corrosion

To guard against the hazards endured during sterilization and storage a reputable instrument lubricant must be applied to all working surfaces and moving parts of all instruments.

Ultrasonic cleaners remove all traces of lubricants from an instrument and it is therefore particularly important to apply a lubricant during every recycling process. The programme used for applying lubricant is up to the individual institution but it could be applied either manually or automatically during the final rinse stage of automated washers. Lubrication helps prevent the friction of metal on metal which would lead to fretting corrosion.

3. Inspection

The importance of inspecting each instrument cannot be overemphasised. Each surgical instrument is designed for a specific purpose. Inspection has to be carried out to ensure that they still function as they should.

In order to avoid damage during handling at this stage place the instruments on specially designed racks and holders to prevent them knocking together, especially the tips of sharp instruments.

All hinged instruments such as clamps and forceps should be checked for stiffness and to ensure the joints work smoothly. The tips & jaws of the instruments should be consistent and be fully approximated when closed to the last ratchet. There should be no excess play in any box joints and the ratchets should operate smoothly, hold firmly, even when knocked, and open easily. The edges of sharp and semi sharp instruments such as scissors, ronguers, chisels, curettes etc should be inspected for sharpness.

Scissors should close smoothly with no 'grinding' around the pivot pin. There should also be no dull spots, chips or dents in the cutting edges.

Plated instruments must be checked for chips, as this would harbour debris, and also for sharp edges and worn spots. Sharp edges will damage tissue, surgeon's gloves and worn spots may be susceptible to rusting and corrosion during sterilization. All instruments with pins and screws should be carefully checked to make sure they are completely intact and safely located.

4. Sterilization

Good cleaning and lubricating practises will help eliminate many of the problems that arise with surgical instruments but if metallic ions or alkaline residue collects on the instrument during sterilization then staining and corrosion will result.

An impure water source, improperly maintained sterilizer, or improperly processed surgical wrappers are all major sources of the impurities which can stain and corrode instruments. Most water sources are unsuitable for use in the generation of steam without some kind of pre-treatment.

In order to guarantee steam quality then the recommendations of pr EN285 regarding the quality of water in the tank, as well as the condensate, should be adhered to otherwise rust particle from the conducting system may cause corrosion or too high a level of silicic acid may lead to discolouration of the instruments.

Methods are usually employed to remove solids, alter hardness and control the presence of dissolved oxygen and carbon dioxide. The water is then further treated so that when it is turned into steam it can be used throughout the hospital for heating and returned to the boiler for reuse. Unfortunately, unless these treatments are carried out very carefully the delivered steam may have unfavourable effect on both the instruments and the sterilizer itself.

Good quality steam at the correct pressure, as recommended, is essential, not only for a long, trouble free life of the instrument but also that of the equipment.

Sometimes good quality steam is delivered to the sterilizer but staining and corrosion still develop. These problems may be caused by the linen wraps used in the preparation of trays for sterilization. The washing, rinsing and final treatment of linen used for this purpose must be understood and the best possible methods strictly adhered to. Condensation is a necessary process for

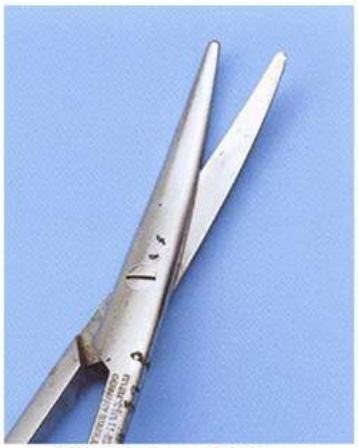
successful steam sterilization. If the instruments have not been completely rinsed so that no chemicals remain on their surfaces then staining and corrosion may occur as these residuals are altered in the presence of high temperature steam.

Proper drying cycles and strict adherence to the equipment manufacturer's recommendations are essential to prevent the formation of excessive moisture and the resulting water spotting which will lead to staining and corrosion.

"PREVENTION IS BETTER THAN CURE"

Remember the four steps to Instrument Care & Maintenance:

1. CLEAN
2. LUBRICATE
3. INSPECT
4. STERILIZE

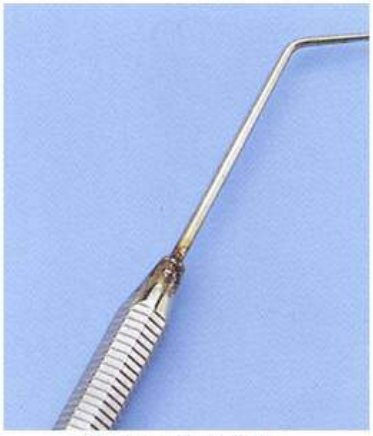


Chloride Induced Pitting

Crevice Corrosion

Stress Corrosion Cracking

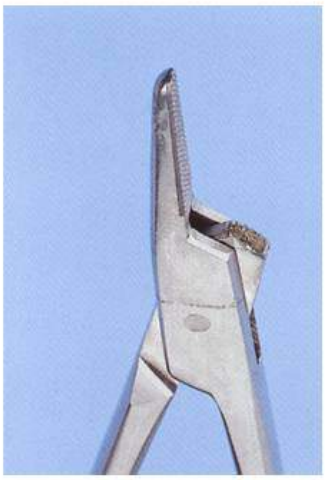
Chloride Induced Pitting



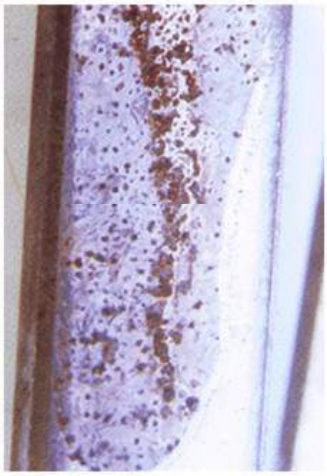
Crevice Corrosion

Stains due to High Concentration of Minerals

Black Tints



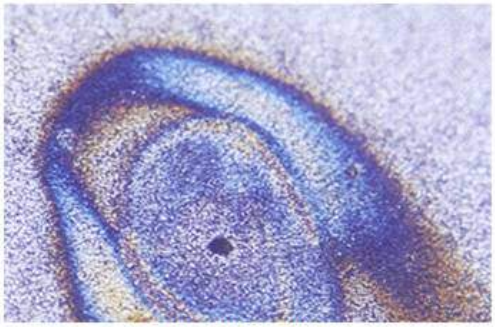
Stress Corrosion Cracking



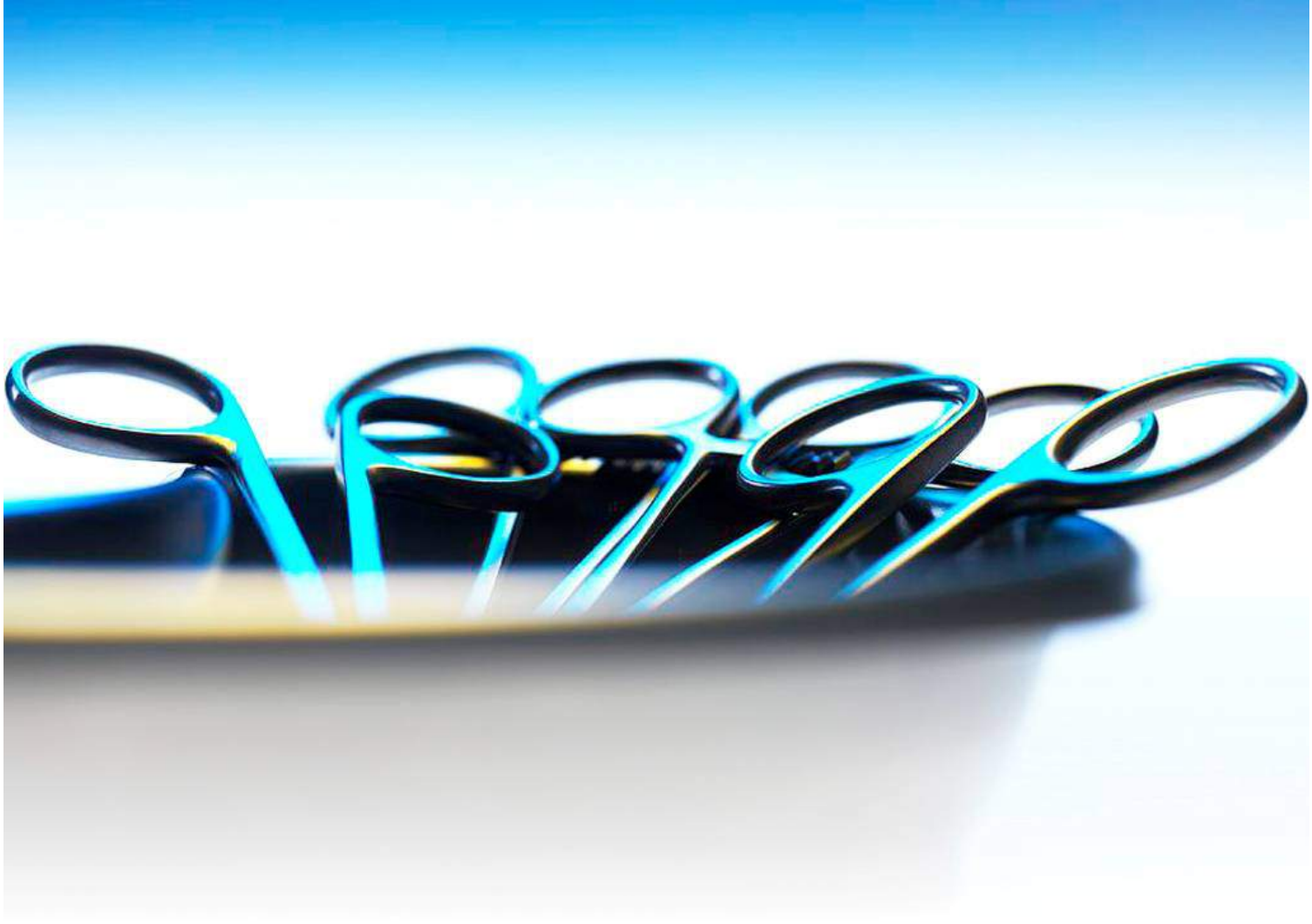
Pitting due to Caustic Solution
(Magnified)

Discolouration & Rusting
Due To Poor Cleaning

Pitting



Pitting (Magnified)



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by

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