

TECHNICAL BULLETIN

Cleaning Blood

Dried, coagulated blood is the most important thing that must be cleaned from surgical instruments. Blood is primarily made from proteins. Wash-Checks use proteins in the test soil to duplicate the challenge that blood gives to cleaning. Proteins can be of two types: water-soluble and water-insoluble. Blood has both. The ratio of water-soluble to water-insoluble proteins in dried blood is approximately 95% soluble and 5% insoluble. You must remove both types of proteins. Water-soluble proteins can be dissolved by water but water insoluble proteins need more than water to be removed.

There are three things that can remove water insoluble proteins effectively in automated washer machines. Protease enzyme detergents and high pH detergents both cause proteins to dissolve and melt away. The third is high impingement of water spray. This blasting of water spray is effective if nothing blocks the spray. It essentially knocks the protein off the instrument.

Detergents fall into three major categories: neutral pH, enzymatic, and high pH. Neutral pH detergents remove many things, including water-soluble proteins, but it is less effective against the water insoluble portion. One can, however, get good cleaning of water insoluble proteins using neutral pH if the impingement is good. Like all detergents, neutral pH detergents do a good job of wetting the soils on instruments and assist with cleaning from impingement. The problem with this is that instruments under a few layers can be blocked from good impingement and then cleaning might not be so effective. The same is true for hinges and places that do not see direct impingement. In those areas you really need to dissolve the proteins using chemistry and not the mechanical action of direct impingement.

So, why use neutral pH detergents at all? The answer is that some instruments are made of soft metals such as aluminum. High pH detergents can stain or perhaps even damage the surface. Enzymatic detergents work better in those cases, but strong direct impingement can be effective with neutral pH detergents. Enzymatic detergents tend to require additional contact time in order to dissolve proteins. The gentler nature requires this additional time. Temperatures tend also to be milder. Extra high temperatures can destroy enzymatic effectiveness. High pH detergents (alkaline detergents) are rather robust and can take higher temperatures. As such, they can be made to clean faster just by increasing the temperature.

The combination of washing temperature, type of detergent, detergent contact time (washing time), strength of impingement, and degree of overloading all play together to influence the effectiveness of cleaning. This is the primary reason why washer monitoring is essential. The low cost of Wash-Checks® makes this convenient and affordable. Wash-Checks are approximately one-third the cost of one particular competitor's product. Since it is made with proteins, it provides an equivalent challenge to the competitor's product and simulates actual human blood.

