

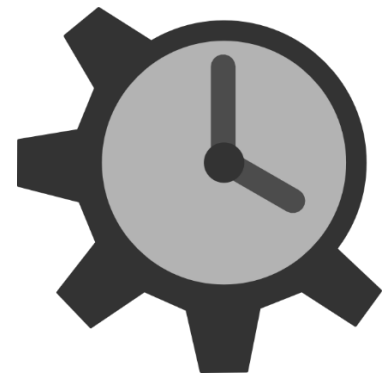


## NEEDLE FREE TECHNOLOGY

*Needle-free injection techniques can be used to administer vaccines and medications in the production animal industry. They offer a fast, safe and effective route of administration. The following list is intended to inform about the advantages of needle-free injection, but also to address possible risks and other points of interest.*

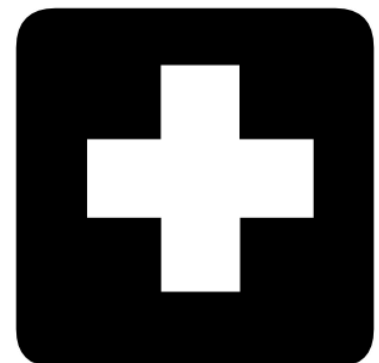
### EFFICIENT

Needle-free injection systems can potentially reduce medical costs for the producer because the chance of injury to an employee from inadvertent needle sticks is eliminated. Needle-free systems also eliminate the purchase of needles. Needle breaks, which can damage tissue and cause a decrease in overall yield and profitability, are also therefore eliminated. In addition the fast immune response provided by needle-free vaccination can lead to increased weight gain and profitability from your herd. Start-up costs associated with needle-free injection systems are not comparable to those of traditional needle and syringe and must be evaluated with long term ROI in mind. Producers should weigh these costs versus the long term benefit to their overall production system.



### SAFE FOR WORKERS

Safety is a key ingredient to any operation. Employees must be properly trained on the use and maintenance of all equipment. Needle injection can be dangerous due to inadvertent needle sticks or cuts. However, needle-free injection is not 100% safe either. To mitigate risks associated with needle-free applicators many technologies integrate multi-step trigger and safety systems. Needle-free systems are designed for a high force dose to be administered very quickly and should only be used with proper training. Operator training is the most important ingredient to the success and elimination of risk associated with a needle-free roll-out.



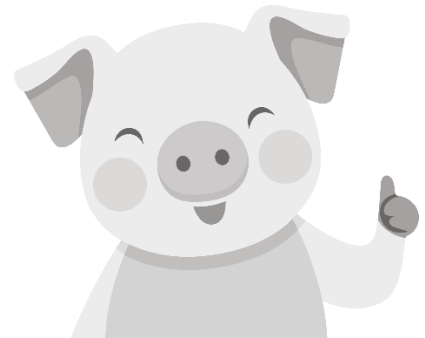
## STERILE

Sterility is a key factor to proper vaccination and drug delivery. Sterility can be affected by human error. For example, the same needle may be used on multiple animals. Workers may forget to change needles when drawing vaccine from a bottle. Needle-free injection takes the needle out of the equation, and due to the high powered dosing mechanism, there is a little to no chance of cross contamination.



## SAFE FOR ANIMALS

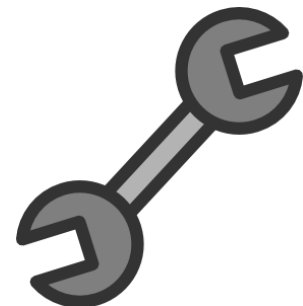
The use of needles, along with human error, may also cause carcass defects. If needles are disposed of incorrectly or dropped after use there is always a possibility of an animal ingesting the needle or being stuck in an unassuming place. Needle-free injection systems eliminate residual needles and needle fragments from carcasses. Needle-free injection also offers a less painful and stressful method of vaccination for the animal, keeping your animals happy and productive!



## METHODS

Needle free injection devices are suitable for many different methods of application. Different systems will have varying potential for application type, but in general intradermal, subcutaneous and intra-muscular injection are possible.

Needle-free Injection Systems are not a new development. The earliest systems were developed in the 1930's and have been used in a wide variety of medical areas over the years. Through innovation and technology there have been modifications and variations that allow for needle-free injection systems to be more widely available and effective to consumers in both animal health and human applications.



## BATTERY POWERED JET

A battery powered jet injector uses a small rechargeable battery pack to retract the dosing device. The dosing device has an electrically driven piston that is automatically redrawn after dosing. It is good for continuous use and minimizes worker fatigue. It is released by a small trigger accompanied by a nozzle sensor to promote user safety. The injector resembles a battery powered hand drill. There are battery powered systems for the administration of subcutaneous, intramuscular or intra-dermal dosage depending on the recommended method.



## SUMMARY

Needle-free injection systems have potential to improve efficiencies. Major advantages of needle-free systems are the elimination of broken needles, a more constant delivery of vaccines and drugs, increased worker safety and increased animal productivity.

Needle-free injection systems are customizable to each operation and can be modified to optimize productivity. However, implementing a needle-free system can be challenging. Workers require training and education regarding any new technique. Start-up and training costs may also affect the interest in this technology for some producers.

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