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HOT FORMING AND QUENCHING TECHNOLOGY

A rigorously studied manufacturing process for the perfect mower blade



The production of high quality lawnmower and brushcutter blades is a complex and refined process. To begin the process, the correct grade of steel is selected which has characteristics that allows external hardness and internal flexibility to provide the end user with a blade that has excellent wear resistance and will not splinter in use. The key to the performance of the blade are the heat treatment and tempering processes.

The first step of the manufacturing process is cutting the rolls of raw material into a shape resembling the profile of the finished article and may include the forming of mounting holes. This can be done either by a press for thinner blades (domestic Flymo, Black & Decker etc) or by laser cutting for the heavier applications. We now have the basic form of the component.

Heating oven, hot forming and quenching

The blades are then heated to 900° and are hot formed and then cropped into their final form using a unique tooling which can only be used for each specific part. Of course, this means that manufacturers will have many specially machined toolings in their factories. After this operation, the blade is quenched in an oil or polymer bath to harden the external surface and give the final component some spring steel characteristics for internal flexibility.

Quenching in a polymer bath rather than in oil is preferable in many modern

manufacturers as the solution is inflammable. However, polymer baths require constant supervision to ensure concentration levels are maintained and need checking continuously. As a result of polymer quenching, the painting process needs to take place almost immediately to avoid the build up of a 'gum' like substance on the component surface.

The blade has now assumed its final shape, all that remains is the grinding of a cutting edge, the tempering process and final work on aesthetics.

Tempering and painting are two operations which can be either combined or treated separately depending on the manufacturing procedure in place. Heating and forming produces the shape of the blade but the disadvantage is that it becomes brittle as it has become too hard.

Bearing in mind how sharp the product is and that it will be used in fast rotation, an additional step is required to ensure the safety of its users. This step is called tempering. It allows the steel to expand and therefore allows it some flexibility so that rather than breaking, it bends. The blade thus provides the required safety.

To give it its final appearance, the blade is painted in big machines which spray epoxy. It is then heated at 200°C for the paint to dry and for tempering to be carried out.

The blades are taken out of the oven. They are now ready to be delivered and assembled on a normal lawnmower or a ride-on lawnmower.

What determines the quality of a lawnmower blade?

Obtaining a good quality blade requires a good choice of raw material as well as flawless management of the production line.

Firstly, the quality of the lawnmower blade is determined by the choice of the raw material used. There are several qualities of steel on the market. Generally, and in order to obtain high quality blades, manufacturers choose a boron steel.

Boron steel for a good quality blade

Boron steel is a general term used to refer to a low premium alloy family of steel. Boron is a material that, when added in small quantities (generally 10 - 50 ppm), has the ability to increase the quenching capacity compared to a steel with the same chemical composition but without any boron. Contemporary use in the chemical industry dates back to the 70s/80s.

Quality control at each stage in the manufacturing process

A well managed production system, particularly one using robots, also contributes to the quality of the finished product. An automated production line allows the quenching and tempering operations in particular to be carried out at a continuous rate. Regular monitoring is carried out at each stage in the production process. Marking the blades allows products to be traced.

EASY CUT II

Improving harvesting performance

The basis of every successful harvest is a good cut. Changes in harvests, such as increasingly green, moist and therefore tough crops, require innovative cutting technology solutions. The Easy Cut II from Gebr. Schumacher GmbH is a cutting system that can increase your harvesting performance. This product also ensures a clean cut and optimum crop flow when working with large cutting widths and at high travelling speeds. The Easy Cut II cutting technology is suitable for older machines as well as high performance combine harvesters. All the latest components are compatible with previous series.

An Easy Cut II kit contains:

- Sectional knife with knife head
- All knife fingers + one spare finger
- Guide plates + roller guide
- Screws + small parts
- Clamp holder (KM-3) for attaching grainlifter
- Blade repair kit

The Easy Cut II cutting system is compatible with harvesters from a wide variety of manufacturers such as Claas, Deutz-Fahr, New Holland and many more. It features an intelligent modular design and customers can choose from three different versions:



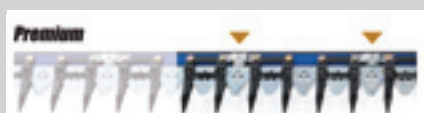
Standard — basic equipment

The standard version features all the Easy Cut II cutting system innovations. The roller guide can be retrofitted at any time.



Comfort — the hold down roller guide

The comfort version includes a hold down roller guide ensuring straight blade movement with increased service life for mower blades and knife fingers. It is recommended for all current combine harvester models and cutting widths.



Premium — double roller

The lower guiding roller provides an additional benefit in the form of a smoother blade guide. This roller is suitable for cutting widths of more than six metres and is only recommended for certain harvester types.

You can find the Easy Cut II in the Kramp webshop by clicking on the **Combine and forage harvester** link and then **Search Make/Model > Schumacher**. Alternatively, you can enter the terms **Easy Cut or Schumacher** in the search box.

FINE CHOICE FOR CUSTOMERS

Comprehensive programme of Lawnmower blades

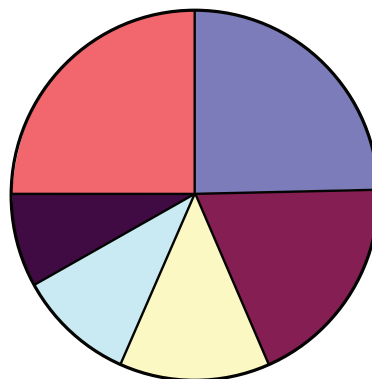
Wouldn't it be simpler to have just a selection of 20 or 30 different lawnmower blades needed to service all machines? Differing only in length and maybe some small variations for the high lift and mulching applications? Yes, it would be, but almost impossible because of the seemingly annual specification changes from OE manufacturers.

Together with Kramp's OEM partners we are focusing on promoting the use of original lawn mower blades because of the combination of market quality requirements and the safety assurances from the rigorous field testing of machine and blade. So, in line with our ambition to be the one-stop supplier for all Forest and Grasscare brands, we must accept having more than 2.000 different lawn mower blades in our European range to provide an alternative for all user preferences. These are not only OE blades. For some brands we offer high quality OE specification 'non genuine' lawn mower blades as an option.

Approximately 42% of the blade references available from Kramp are original, 53% non genuine and 5% universal blades. In sales quantities it's different, original blades have a higher demand than the non genuine versions, and still increasing against the non genuine.

If we analyse the different Original blades available from the Kramp range we can see that this matches the larger OE manufacturers available in Europe.

Original Lawn Mower blades available from the Kramp range



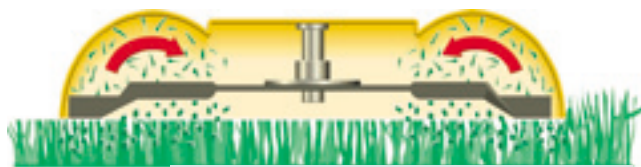
- MTD (also Incl. Wolf)
- GGP (Stiga, Castel Garden)
- Husqvarna Group (Flymo, Husq, AYP, Partner)
- Alko (also Incl. Brill)
- Murray
- Others (20 Brands)

The Kramp range of Lawn Mower blades starts from the 20 – 25cm length blades for the smaller 'domestic type' electric mowers to the 80 – 90cm blades for Snapper, Toro, Etesia and others. The range consists of normal straight blades, blades with high lift wings for grass collecting, mulching blades, dethatcher blades, universal blades with adaptor ring sets and of course the brand specific Original blades and many others.

Please visit our webshop where we have sorted all blades by brand name and included all important measurements for easy identification so you can be sure that you have selected the correct blade.

MULCHING TIP

Lawn care made easy



In landscaping and agriculture, "mulching" involves covering small or large areas of ground with fresh organic materials. Mulching is highly effective when working on lawns. The best mulching results are achieved when two thirds of the lawn is left to stand and one third is mowed. This work is carried out using special lawn mowers, such as those supplied by Stiga, which are fitted with mulching blades. They offer a range of benefits for users.

Save time, protect the environment

Using a multi stage process, blades of grass are chopped so finely that after a few days they disappear into the lawn, so you no longer have to rake up and dispose of the grass cuttings. Not only does this mean that the job is done a lot more quickly, but it is also more environmentally friendly as the lawn mower needs to be used less, considerably decreasing fuel consumption and exhaust gas emissions.

Save money

No costs associated with the disposal of garden waste.

Fewer problems with pests

Grass cuttings on the compost often attract uninvited guests, but mulching solves this problem.

A natural fertiliser

The grass cuttings decompose quickly and turn into a natural lawn fertiliser, so artificial fertiliser is not required.

Less watering

The finely chopped blades of grass form a thin layer on the lawn that absorbs moisture so you do not need to water the lawn as often. This also reduces the risk of the lawn burning on particularly hot days.

Reduced noise

In comparison to "normal" lawn mowers,

It depends on the blade



The special blades inside the lawn mower are an important component for achieving professional mulching. The Kramp product range contains almost 300 different mulching blades, particularly original blades from leading brands. In addition, Kramp offers a superb range of universal mulching blades with lengths of 18–22cm, Part No. FGP012801 to FGP012805. The blades are 3.8mm thick and 57mm wide. The central bore measures 9.5mm and both slotted holes are 9.53 mm x 38.1mm.

those used for mulching are considerably quieter. This is because the closed housing, in which the blades of grass are chopped, absorbs the sound.

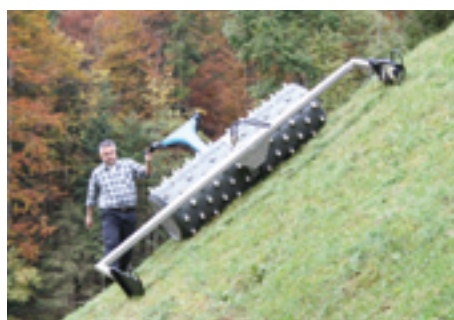
CUTTER-BAR CUTTING DECKS FROM ESM

Razor sharp technology



Whether you are cutting, mowing or mulching, high quality professional equipment can make the job a lot easier. Ennepetaler Schneid- und Mähtechnik GmbH & Co. KG (ESM) supplies a wide range of top quality components for machines such as bank mowers, windrow inverters, mowing buckets or vegetable harvesting machinery.

The company, which is based in the town of Ennepetal in North Rhine-Westphalia, Germany on the southern border of the Ruhr region, provides intelligent solutions for a variety of applications. ESM is a specialist in the oscillating cutting technology sector. Cutter-bar cutting decks with single cutter beams as well as double cutter beams are available to users.



In the first version, the cutter bar consists of one knife that swings back and forth on a fixed base. The cutting decks are designed for robust use and also withstand contact with foreign objects that can be found in grass and reeds. The second product group with ESM/BUSATIS double knife technology works in a gentle manner with minimum vibration. It is ideal for light, manageable equipment. In this technology, two knives swing, like a pair of scissors, in opposite directions. Double knife working widths of ten metres and above are the technical standard today. ESM is the global market leader in this technology.

The company has developed a range of innovative products that have enabled it to enter new markets in Asia as well as in South, Central and North America over recent years. However, its core market of Europe is always presenting new challenges, and ESM has tackled them by, for example, working with Kramp to develop special mowers for cutting flower bulbs.

Comprehensive sales coverage

ESM manufactures mowers for original



Managing Director Karl-Richard Strohn (L.) and ESM Sales Manager Hans-Josef Überberg

equipment manufacturers such as Agria, Reform, Tielbürger, Aebi, Herder, Rapid Vogel&Noot, Berky, and more. In addition to its new machinery business, its original spare parts service also plays an important role at the Ennepetal-based cutting and mowing specialist. ESM is working closely with Kramp to ensure a comprehensive supply of parts both in Germany and abroad.

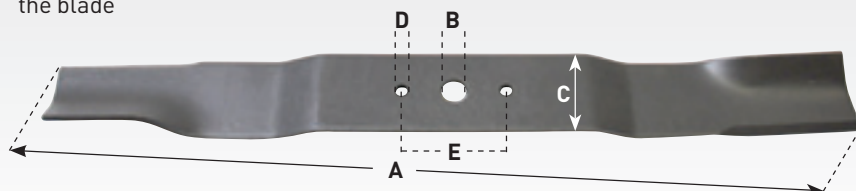
The extensive product range includes complete cutter bars as well as spare parts for cutter bars and drives. To find the correct item, visit the Kramp webshop and click on **Grass/Feeding Parts** in the left navigation column and then on **Search Make/Model**. Alternatively, you can follow these links: **Grass/Feeding Parts > Cutter bars (spare parts and accessories for cutter bars) > Mower knives > Mower knives > Cutter bar mower knives suitable for ESM**.

SERVICE FOR YOUR CUSTOMERS

Measuring your lawn mower blade correctly

Not all lawn mower blades are alike. Customers often come to a specialist dealer with a sample blade that needs to be replaced without knowing to which type of lawn mower it belongs. This issue can be quickly managed by measuring the blade. Follow these steps to take a correct measurement:

- A: Measure the length diagonally from blade point to blade point
- B: Measure the size of the central bore
- C: Measure the width at the widest point of the blade
- D: Measure the size of the outer bores
- E: Measure the distance between the two outer bores (from hole centre to hole centre)



ROTARY MOWER BLADES

Extensive range at Kramp

One of the most important areas of work in the grass and feeding technology sector is mowing grass. There are machines to serve this purpose available on the market from a variety of manufacturers. Various types of rotary mower blades are used in high-quality professional equipment. Kramp offers a comprehensive product range designed to meet this need. In the Kramp webshop, you can choose between 150 different types of original rotary mower blades as well as 200 types of universal rotary mower blades.

If you know the type of machine you own, simply click on Grass/Feeding Parts and

find the appropriate brand under Search Make/Model. If you only know the size of the rotary mower blade, click on Grass/Feeding Parts, Rotary mowers and disc mowers and then on Rotary mower blades. Here you will find all the rotary mower blades that are in stock with details of the brand as well as their exact measurements.

Universal rotary mower blades are now being distributed under the Kramp brand. The item numbers for these products therefore all end with the letter KR.



BALANCING DEVICE FOR LAWN MOWER BLADES

Correct the imbalance and avoid damage

Lawn mower blades become blunt over time. But you don't always have to buy a new blade. Often the parts simply need to be re-sharpened. However, if an equal amount of metal is not ground from both ends, this can result in an imbalance that transfers to the lawn mower crankshaft and can cause damage to the engine, equipment and bearings. The user's safety is also compromised as the lawn mower vibrates more strongly due to the blade imbalance. In order to ensure that the blade works perfectly, a number of professional products are available, such as the FGP000064 blade balancing device with movable magnet, cone and built-in telescopic arm. It is fixed to the wall and is suitable for blades with

a central bore of 10–32 mm. The blade is attached in a central, vertical position and balanced. Using the telescopic arm, you can check whether both halves of the blade are of equal length. The balancing device can be used to balance the blade to one tenth of a gram. In addition, string trimmer blades can also be balanced, making the balancing device a product for all seasons.



Removal of mown grass

If grass needs to be collected immediately in a grass catcher or trailer during mowing, a discharge hose is usually used.

A discharge hose is used with a (professional) lawnmower or with a flail mower in which a powerful fan blows the mowing waste into the trailer. A strong and flexible hose is required for all these applications. In some cases, the waste material will be relatively light and clean and in other cases it may contain branches, cans, bottles or stones etc.

A hose for a roadside mower will therefore need to be stronger (thicker) than a hose for a lawnmower, so Kramp has several different types of hoses in its range. These types of discharge hoses are often made from polyurethane (PU) with a spiral reinforcement. PU is an ideal material for these suction hoses as it is flexible and very durable, although the drawback of standard PU is that it is not resistant to microbes. Microbes are unicellular living organisms such as bacteria, algae and fungi. Microbes attack the PU material, weakening it and causing the hose to leak. Microbes can often be found on moist organic materials, which is why hoses used for the removal of grass, leaves and wet sawdust must always be made from a microbe-resistant PU material.

SL37 - In various sizes from 75 to 250 mm. This hose is suitable for lighter applications such as lawnmowers (e.g. SL37100).

SL170 - In various sizes from 100 to 400 mm. This hose has a thicker wall and is suitable for heavier applications (e.g. SL170300).

SL101300 - This hose, which has a diameter of 300 mm, is suitable for heavy applications such as roadside mowers. This hose is available per metre and in a length of 11 metres (SL10130011).