



GRANIT
QUALITY PARTS

ENDURANCE
CARBIDE

SHARE POINTS

PRODUCT BENCHMARK

CUSTOMER INFORMATION

THE FOLLOWING WERE COMPARED:

Hard metal share points for Horsch Tiger LT

The GRANIT ENDURANCE CARBIDE share point with part number 179316661 was compared with comparable products from an original manufacturer and five other competitors.

COMPARISON OF FEATURES

- » Material analysis on the share body
- » Hardness test on the share body
- » Hardness test on the hard metal plates
- » Evaluation of the soldered connection between hard metal plates and share body
- » Validation of laboratory results by means of field tests

THE BASICS

Why do tillage tools such as the GRANIT ENDURANCE CARBIDE parts consist of a combination of a standard wearing part and a welded-on hard metal plate? To answer this question, a basic knowledge of tillage wearing parts is required. Choosing the right combination of material and hardness is important when it comes to tillage parts.

THE CHOICE OF MATERIAL FOR THE BODY:

Here it depends on the wear-reducing alloy components. If a simple carbon steel is chosen, it will always be inferior (even with high hardness) to a steel refined with manganese and boron for example.

TEMPERING/HARDNESS OF THE BODY:

This determines the right degree of flexibility (for example in the event of contact with foreign bodies) and service life.

If it is too low, the service life will be too short and the wearing parts could bend. If it is too high, the share or other parts undergo less wear, but will be so brittle that they will break at the slightest contact with foreign bodies.

To ensure that all desirable properties are achieved, a combination of a flexible body and an extremely hard metal plate is chosen. However, qualitative differences between the various manufacturers are also apparent here, as this product benchmark shows.

TEST REPORT NO. 2021-01/1218



**Steinbeis-Transferzentrum
Werkstoff- und Bauteil-
prüfung (WBP)**

This product comparison was carried out on behalf of GRANIT PARTS by the Steinbeis Transfer Center laboratory.



TEST RESULTS

MATERIAL ANALYSIS AND HARDNESS TESTING:

A total of seven products from different manufacturers and suppliers were examined. The material analysis shows that a total of three different materials were used for the body. These were C45 carbon steel, and 30MnB5 and 34MnB5 quenched and tempered steels. The latter two differ mainly in terms of carbon content, and are both very well suited for the intended use. Like the parts from the original manufacturer, the GRANIT ENDURANCE CARBIDE share points are made of 34MnB5 quenched and tempered steel.

The hardness values of the bodies vary significantly, and range from just 185HV1 up to 515HV1. The maximum value is very close to the range where brittleness occurs, resulting in an increased risk of breakage. On the other hand, the low values lead to increased and undesirable wear.

The range of hardness values exhibited by the hard metal plates is not so broad. However, differences are also apparent here, which lead to different levels of wear. The values range from 1351HV1 down to 1159HV1.

In order to give a complete overview, the results of the laboratory tests have been summarised in the following table.

Supplier	Body material	Body hardness	Hard metal plate hardness	Evaluation
GRANIT ENDURANCE CARBIDE 179316661	34MnB5 1.5534	446HV1	1351HV1	++
Original manufacturer	34MnB5 1.5534	515HV1	1159HV1	+
Original manufacturer	34MnB5 1.5534	205HV1	1159HV1	-
Competitor 1	30MnB5 1.5531	251HV1	1159HV1	-
Competitor 2	30MnB5 1.5531	251HV1	1219HV1	0
Competitor 3	34MnB5 1.5534	426HV1	1219HV1	+
Competitor 4	C45 1.0503	185HV1	1159HV1	-

Table 1: Materials and hardness

CONCLUSION:

When it comes to tillage tools, a balanced relationship between material properties, body hardness and hard metal plate hardness is important. When considering the values in the table above, it is immediately apparent that the GRANIT ENDURANCE CARBIDE shares boast the best relationship between these properties. As mentioned above, excessive hardness can lead to breakage in the event of contact with foreign bodies, rather than the resilience desired.

EVALUATION OF THE SOLDERED CONNECTION BETWEEN HARD METAL PLATE AND SHARE BODY:

The properties mentioned above only relate to the individual components. However, the hard metal plates are attached to the body by means of hard soldering. If this soldering is not carried out properly, even minor contact with foreign bodies can result in the hard metal plates breaking out or being lost completely. This is therefore a key quality feature.

RESULTS:

The results have been summarised in the table below with the help of photographs.

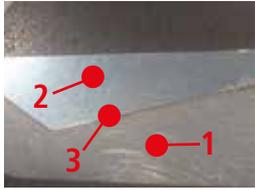
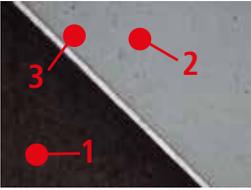
Supplier	Overview of soldering	Close-up of soldering	Evaluation	Result
GRANIT ENDURANCE CARBIDE 179316661			++	There are no defects in the soldered connection. The connection is completely interlocked.
Original manufacturer			++	There are no defects in the soldered connection. The connection is completely interlocked.
Original manufacturer			-	There are pores (black spots) and imperfections in the soldered connection. The connection is not completely interlocked.
Competitor 1			0	There are pores (black spots) and imperfections in the soldered connection. The connection is not completely interlocked.
Competitor 2			-	There are pores (black spots) and imperfections in the soldered connection. The connection is not completely interlocked.
Competitor 3			-	There are pores (black spots) and imperfections in the soldered connection. The connection is not completely interlocked.
Competitor 4			++	There are no defects in the soldered connection. The connection is completely interlocked.

Table 2: Evaluation of the soldered connection

Key:

1: Base material 2: Hard metal plate 3: Soldered connection

CONCLUSION:

Only three of the seven manufacturers were able to produce an interlocked connection. The GRANIT ENDURANCE CARBIDE shares also impress with their extremely high quality. As described above, the pores and imperfections exhibited by the other four versions - including the share point from the original manufacturer - can cause the hard metal plate to break out.

VALIDATION OF LABORATORY RESULTS BY MEANS OF FIELD TESTS:

In order to verify the 'theoretical' results from the laboratory, a detailed field test was carried out. In this practical test the seven test parts were mounted on the test cultivator so that the wear conditions could be compared with each other. This means that comparisons were only ever made within a row (1st, 2nd and 3rd row), and inside or outside the tractor track. This ensured that the parts being compared were always subjected to the same degree of wear.

In order to obtain exact data regarding the number of hectares processed (excluding the influence of errors such as tractor change, driver change, incorrect operation, etc.), an autonomous hectare counter specially manufactured for this test was mounted on the cultivator. For the test evaluation, the shares were measured before use. The length, the thickness and (most importantly) the weight were recorded. After the test was completed, these parameters were recorded again in relation to the number of hectares processed. This was then used to produce a ranking.



Figure 1: Fully assembled test cultivator



Figure 2: Autonomous hectare counter

RESULTS:

The results were tabulated and evaluated. Unfortunately, due to constant breaks one test part from the original manufacturer dropped out completely. No data could be determined.

Supplier	Average yield per hectare/share point	Evaluation
GRANIT ENDURANCE CARBIDE 179316661	855.71 ha	++
Original manufacturer	797.50 ha	+
Original manufacturer	No data	—
Competitor 1	638.00 ha	+
Competitor 2	473.50 ha	-
Competitor 3	531.67 ha	0
Competitor 4	426.67 ha	-

Table 3: Hectare output

CONCLUSION:

With an average hectare output per share point of 855.71 ha, the GRANIT ENDURANCE CARBIDE share points performed better than their competitors in this field test thanks to their high-quality tempering. With an average hectare output of 797.50 ha, the share point from the original manufacturer evaluated in the field test took second place, but is still clearly behind the GRANIT ENDURANCE CARBIDE share points.

CONCLUSION:

The GRANIT share points are characterised by the following features:

- Excellent choice of materials
- Optimum hardness/toughness ratio in the body
- Hardest metal plate for longest service life
- Completely interlocked soldered connection
- Best results in the field test

GRANIT once again played to its strengths as a supplier of quality products. Many years of experience and close cooperation with manufacturers, test laboratories and experts has resulted in excellent products. Both in theory (laboratory) and in practice (field test), the GRANIT ENDURANCE CARBIDE share points beat the competition by a wide margin and took the top spot. GRANIT ENDURANCE CARBIDE - developed for the toughest conditions.