

**Garant**
**GARANT Master Steel MICRO solid carbide drill, plain shank DIN 6535 HA  
12×D, AlCrN, Ø DC h6: 2,31-Xmm**

**Order data**

Order number	121226 2,31-X
GTIN	4062406632700
Item class	10F

**Description**
**Version:**

**High-performance micro-drill** for universal material use, focussing on steel processing. Maximum process reliability due to **exactly matched tools within the overall system** and **expanded guide chamfers**. Drilling of very small diameters down to the maximum depth after creating a pilot hole. **Optimum compromise between core diameter and flute size for optimum chip evacuation** – even with long-chipping materials. The **increased metal removal rates and longer tool life** ensure an economical drilling process, even with very small hole diameters combined with a large L/D ratio.

**Note:**

For reliable use of the micro-drills from 8×D, a **pilot hole of at least 4×D** is required using the micro-pilot drill 121223. For vertical machining and flat workpiece surfaces, a pilot hole can be dispensed with from  $D_c = \varnothing 1$  mm up to a length of 12×D. Please always ensure that the **pilot hole is free from chips** before using the subsequent drilling tool. We recommend setting a 90° counterbore with a suitable NC spotting drill after the pilot hole has been completed. For critical applications (e.g. highest possible production accuracy, minimal burr formation, reduced coolant pressure), reduce the feed rate of the tool by 50% before entering and exiting the material. Long-chipping materials may require **chips to be evacuated** in steps of 3×D each by moving the drill back slightly at pilot hole depth. Please make sure that you use a suitable **tool clamping device** (shrink-fit chuck, hydraulic clamping chuck) with a radial run-out of less than 0.003 mm, a sufficiently high **coolant pressure** (at least 30 bar), as well as sufficiently fine **filtration** of the cooling medium ( $D_c < \varnothing 2$  mm with filter  $\leq 0.010$  mm;  $D_c < \varnothing 3$  mm filter  $\leq 0.020$  mm). The specified L/D ratio gives the **minimum achievable depth of hole** with the respective micro-drill. Flute length  $L_c = L_2 + 1.5 \times D_c$ . Delivery time: 10 working weeks

Minimum order quantity: 5 pieces

Items made to order for a specific customer: Cancellation only up to a maximum of 3 working days after receipt of order acknowledgement. Items cannot be returned. We reserve the right to over or under deliver by +/-10% (min. 1 pc).

## Technical description

Shank $\varnothing D_s$	3 mm
Standard	Manufacturer's standard
Flute length $L_c$	33.6 mm
Number of cutting edges Z	2
Overall length L	65 mm
Tolerance nominal $\varnothing$	h6
$\varnothing$ range	2.31 - 2.4 mm
Series	Master Steel
Coating	AlCrN
Tool material	Solid carbide
Version	12xD
Point angle	128 degrees
Shank	DIN 6535 HA to h6
Through-coolant	yes, with 25 bar
Machining strategy	HPC
Pilot drill required	yes, pilot drill
Semi-Standard	yes
Colour ring	green
Type of product	Jobber drill

## User data

	Suitability	$V_c$	ISO code
Aluminium (short chipping)	suitable only under restricted conditions	50 m/min	N
Alu > 10% Si	suitable only under restricted conditions	50 m/min	N
Steel < 750 N/mm <sup>2</sup>	suitable	80 m/min	P

Steel < 900 N/mm <sup>2</sup>	suitable	70 m/min	P
Steel < 1100 N/mm <sup>2</sup>	suitable	60 m/min	P
Steel < 1400 N/mm <sup>2</sup>	Suitable	50 m/min	P
INOX < 900 N/mm <sup>2</sup>	suitable	50 m/min	M
INOX > 900 N/mm <sup>2</sup>	suitable	35 m/min	M
Ti > 850 N/mm <sup>2</sup>	suitable	25 m/min	S
GG(G)	suitable	70 m/min	K
CuZn	suitable only under restricted conditions	50 m/min	N
Uni	suitable		
wet maximum	suitable		
wet minimum	suitable only under restricted conditions		