Information on our NASTON product ①

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Three elements of grindstone

A grindstone is made of three elements: stone grains, a bond and pores

Stone grains

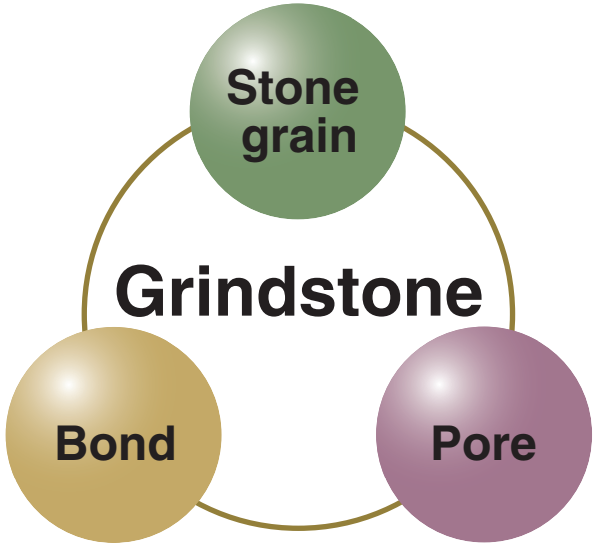
The stone grains are an essential element for cutting workpieces. Each grain acts as a cutting edge to cut workpieces. When grains are abraded and their cutting performance is lost, those grains come off and new ones appear. Thanks to this self-regenerative feature, the cutting performance of the grindstone is maintained until the end of its service life.

Bond

The bond keeps the stone grains together. There are bonds with various levels of hardness (bonding levels). The bonding level significantly influences the abrasion level and cutting performance of the grindstone.

Pores

When cutting the workpieces, chips and heat will be generated through abrasion. To address them, innumerable pores are included in the grindstone. Roughly speaking, the grindstone has a pumice-like structure. The chips generated through cutting will enter these pores and be expelled when the grindstone rotates. Without pores, a grindstone would immediately stop working because there would be no place to accommodate the chips. Further, the pores serve to cool down the grindstone by allowing air to go inside it. Therefore, the pores in a grindstone play very important roles that should not be overlooked.



Reading the label description

The standardized label description for grindstones is indicated below.

- **Example:**

205 × 0.8 × 25.4	A	100	N	B	
Dimensions (outer dia. × thickness × inner dia.)	Stone grain	Grain size	Bonding level	Bond	Peripheral velocity

Stone grain, grain size … coarse to fine grain, bonding level … soft to hard, bond…resinoid

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Processing with a NASTON

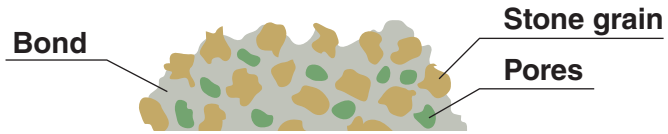
Characteristics

It is a type of precision processing conducted with a grindstone wheel rotating at high speed. A workpiece is cut gradually by extremely hard particles (stone grains) included in the grindstone. Because it is a cutting process based on abrasion, any damage to the workpiece is kept to a minimum and a very fine finish can be obtained. This makes the product suitable for precision cutting with its excellent cutting performance.

Mechanism

The numerous grains extruded on the action surface of the grindstone will cut a workpiece gradually. Meanwhile, the extrusion of the grains is also abraded, destroyed and detached from the action surface. After the old grains came off, new ones appear on the action surface one by one.

● **The grindstone is made of three essential elements: stone grains, a bond and pores**



● **Basic label description for grindstones**

A (Grain) **100** (Grain size) **N** (Bonding level) **205** (Outer diameter) × **0.8** (Thickness) × **25.4** (Inner diameter)

▼**There are the following types of grains. It is best to use a grindstone with suitable grain characteristics for your workpiece.**

	Category	Symbol	Description	Characteristics and application
Stone grain	Alumina type	A	Alundum	Being manufactured from bauxite, it is suitable for cutting materials with high tensile strength such as iron or steel due to its toughness (fracture toughness).
		WA	White Alundum	Compared to Type A grain, the abrasion of the cutting edge is slower and a sharp edge appears quicker. Because the entire resistance against workpieces is lower, less heat is generated than with Type A grain. Depending on the properties of a workpiece, Type WA may have a better performance than Type A.
		HA NA	Heiwa Alundum	Our original grain. Because of its sharp edge and appropriate level of fracture strength ensuring high grinding performance, it is suitable for ultra-hardened products and such like.
	Carbide type	GC	Green Carbolundum	Being mainly manufactured from silica and carbide, it has a low toughness despite its high hardness. It is suitable for non-metal materials in general.
		TC	Diamond	It is the hardest type of grain suitable for cut-resistant materials that cannot be cut with other types of grindstones. It tends to be affected by the heat generated during cutting.
	Mixed type	AC	Alundum and carbolundum	Mixture of Type A and Type GC grains. Suitable for cutting malleable casting iron

Selecting Heiwa's Grindstone Wheels for Precision Cutting

[NASTON/NASTON GOLD Series]

		Material	Application: Hardness (comparison of hardness)	Wheel Part Number	
General steel materials, thick and special steel materials		Standard carbon steel (S-C), tool steel (SK), soft steel (SS), tool alloy steel (SKS), die steel (SKD), hardened spring steel (SUP) etc.	Ejector pin for metals, key material, drawing profile, springs, regular pipes, wires Rockwell hardness (Rc) Approx. 31 to 50.5 Vickers hardness (Hv) Approx. 310 to 520 Drill rods, hardened products, metals for SEM inspection, machine parts, hardened gauge plates, small bore drills, end mill cutting Rockwell hardness (Rc) Approx. 35 to 55 Vickers hardness (Hv) Approx. 345 to 595	A100N A100P 31-A Stainless A HA80P HA100J NA100J AC100J	 A100PB
		Special alloy, cut-resistant complex material, ultra-hardened material, regular cast (FC)	SCM, SKD (material with large cross section) Rockwell hardness (Rc) Approx. 35 to 55 Vickers hardness (Hv) Approx. 345 to 595 Ultra-hardened products made of special steel (SNCM), high-speed steel (SKH) and stainless steel (SUS) etc. Rockwell hardness (Rc) Approx. 60 to 70 Vickers hardness (Hv) Approx. 697 to 1076 Electrical steel, malleable casting iron, aluminum alloy Rockwell hardness (Rc) 21.3 or less Vickers hardness (Hv) 255 or less		 NA100JB
Non-ferrous materials, general materials, complex materials, thin-wall pipes		Stainless steel, Inconel magnesium, non-ferrous material, tungsten, molybdenum, precious metals including gold and silver, titanium, hard rubber, resin, Bakelite, rock, crystal, quartz, ceramics, hard glass, soda glass, carbon, phenol or epoxy resin	Precision pipes, medical equipment, golfing gear, electronic parts, LC panel contacts, car parts, thin-wall pipes, small decorative items, complex material parts, dental specimens, decorative items made of hard material, general glass processed items, small decorative items Rockwell hardness (Rc) Approx. 21.3 to 40.8 Vickers hardness (Hv) Approx. 70 to 400 *Rockwell hardness (Rc): 20 or less, Vickers hardness (Hv): 238 or more.	GC100P GC100N GC150N GC150L GC150H GC320R Stainless B GC400L WA220R	 GC150HB  GC150LB
Hard and brittle materials		Super-hard alloys, ceramics, quartz, crystal, hard glass, ferrite, carbon, magnetic materials, nickel, molybdenum, tungsten	Cutting tools, car parts, electronic parts, LC panels, aircraft parts, semiconductor heat sink materials, heat sinks Rockwell hardness (Rc) 75 or more Vickers hardness (Hv) 1478 or more	TC-1 TC-2	 TC-1

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