

Press release

KYOCERA Develops New Cermet Grades for Cutting Tools Industry

New TN620 and PV720 cermets for steel processing offer 50% better abrasion resistance and fracture resistance than conventional grades

April 13, 2015 – Kyoto/Neuss – Kyocera Corporation announced that it has developed a new series of cermet grades offering a 50%* improvement in abrasion resistance and fracture resistance over conventional materials used as industrial cutting-tool inserts.

The new TN620 and PV720 cermet grades are ideal for a wide variety of metal-cutting applications ranging from high-speed to low-speed machining.

TN620 and PV720 exceed conventional materials in both hardness and strength through proprietary material technologies, such as a special structure surface hardening that distributes ultrafine particles within the cermet in a more optimal manner; bonded phase, including special metal phase with high melting points; and hard phase with superior compressive stress effects. Furthermore, PV720 builds on the superior properties of TN620 by adding MEGACOAT NANO, a multilayer coating technology never before applied to a cermet.

These new grades expand Kyocera's cutting-tool product line, helping users achieve higher productivity through longer tool life and stable processing of steel components widely used in automobiles and industrial machinery.

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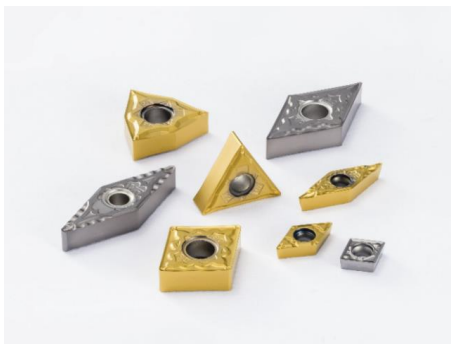
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Product Overview

Grades Name	TN620	PV720
Lineup	383 inserts	383 inserts
Processing conditions	Finishing to medium cutting of steel; turning	
Production base	Sendai factory, prefecture Kagoshima, Japan	



TN620 (silver) and PV720 (gold) metal-cutting inserts

Kyocera has drawn on its many years of cermet technology development to create these new materials, which offer improved abrasion resistance, better fracture resistance and better surface finish quality than conventional steel-cutting tools.

Main Features

1. Special surface-hardening structure improves abrasion resistance

Both TN620 and PV720 utilize a special graded composition to create a surface-hardening structure, which improves both hardness

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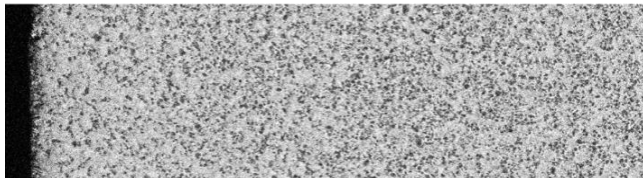
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and toughness. By using tough cermet with superior chipping resistance and thermal shock resistance for the internal structure, and high hardness cermet for the surface structure, the new materials achieve superior fracture and abrasion resistance, as well as stable processing.

Surface ← TN620 composition → Interior

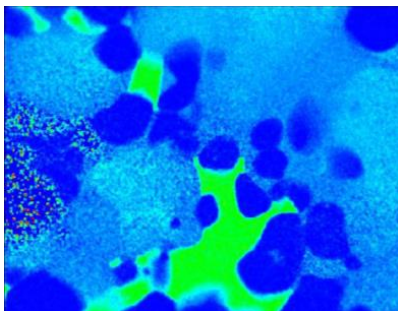


Magnified photo of the new cermet material:

surface (far left) and interior (right)

2. High-melting-point bonded phase ensure higher-quality machining with improved surface finish

By creating a composite of conventional cermet and high-melting-point metal-bonded phase, the resulting bonded phase are highly heat resistant. This improves adhesion resistance, chipping resistance and fracture resistance to provide a stable machined surface of superior quality.



**Analytical photo of bonded phase
(bonded phase are colored in
green)**

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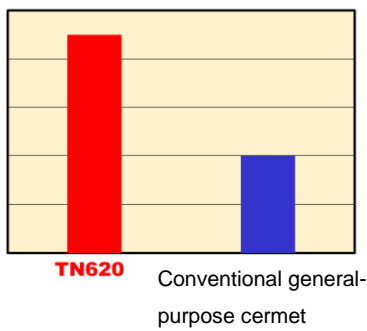
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3. Ultrafine-particle hard phase improves strength and fracture resistance

The new materials offer improved flexural strength by incorporating a uniform ultrafine-particle “hard-phase”. In addition, high-melting-point metal binding phases increase compressive-stress effects for better fracture resistance.



Comparison of hard-phase compressive residual stress (against conventional general-purpose cermet)

4. Proprietary MEGACOAT NANO multilayer coating technology

The PV720 grade improves on the already strong characteristics of TN620 by including Kyocera’s proprietary MEGACOAT NANO multilayer coating technology. Utilized for the first time on a cermet, MEGACOAT NANO provides outstanding abrasion and oxidation resistance for higher-efficiency machining with superior surface finish.

* Compared to conventional Kyocera cermet, based on research by Kyocera.

For photos, please visit:

http://global.kyocera.com/news/2014/1101_isgi.html

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For more information about Kyocera:

www.kyocera.eu

About Kyocera

Headquartered in Kyoto, Japan, Kyocera Corporation is one of the world's leading manufacturers of fine ceramic components for the technology industry. The strategically important divisions in the Kyocera Group, which is comprised of 230 subsidiaries (as of April 1, 2014), are information and communications technologies, products which increase quality of life, and environmentally friendly products. The technology group is also one of the largest producers of solar energy systems worldwide, with more than 5 gigawatts of solar power having been installed around the world to date.

The company is ranked #531 on *Forbes* magazine's 2014 "Global 2000" listing of the world's largest publicly traded companies.

With a global workforce of about 70,000 employees, Kyocera posted net sales of approximately €10.19 billion in fiscal year 2013/2014. The products marketed by the company in Europe include laser printers, digital copying systems, microelectronic components, fineceramic products and complete solar power systems. The Kyocera Group has two independent companies in the Federal Republic of Germany: Kyocera Fineceramics GmbH in Neuss and Esslingen and Kyocera Document Solutions in Meerbusch.

The company also takes an active interest in cultural affairs. The Kyoto Prize, a prominent international award, is presented each year by the Inamori Foundation — established by Kyocera founder Dr. Kazuo Inamori — to individuals and groups worldwide who have contributed significantly to the scientific, cultural, and spiritual betterment of humankind (converted at present €362,000 per prize category).

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