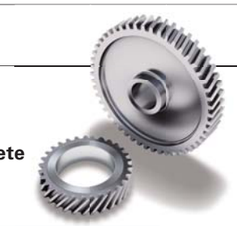
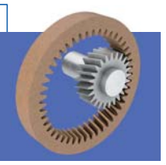
Issues and Proposals for Improvement of Automotive Engine Manufacturing Processes

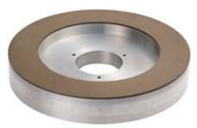
Gear

Heat treatment → Small gear / Large gear → Width grinding → Inner diameter grinding (honing) → Internal grinding → Periphery and end face grinding → Gear grinding • polishing → Complete



	Width grinding	Inner diameter grinding (honing)	Internal grinding	Periphery and end face grinding	Gear grinding	Gear grinding + polishing	Gear honing
Process							
Aspects	Large stock removal	Must meet cylindricity and surface roughness requirements	Grinding wheel diameter is smaller than workpiece inner diameter	Large contact area between grinding wheel and workpiece	Dressing conditions that are prone to glazing	Grinding and polishing are possible with one grinding wheel	Large number of teeth where grinding wheel and workpiece mesh
Issues	Wheel surface loses form, decreasing cutting ability	Balanced cutting ability and tool life	Deterioration of surface roughness	Grinding burn on side face	Grinding burn	Reducing grinding time	Short wheel life
	Proposal	Proposal	Proposal	Proposal	Proposal	Proposal	Proposal

Grinding wheel with dresser



Besler Wheel (CBN Wheel)
Standard specifications:
CBC 230 P 75 BX331

Rough grinding
MIK1 Series (CBN Wheel)
Standard specifications:
CBM 120 to 200 M 50 MIK1

Finish grinding
MH5 Series (CBN Wheel)
Standard specifications:
CB 325 to 1000 H 30 MH5

CX grinding wheel (Conventional grinding wheel)
Standard specifications:
CXZ 120 N 8 V104

LL single-point dresser
Standard specifications:
L1T1-0603

VN1 (CBN wheel)
Standard specifications:
CB 170 M 200 VN1

Metal bond rotary dresser
Standard specifications:
SD 40 Q 90 MW7

LIFE KING (Conventional grinding wheel)
Standard specifications:
TA 60 J 8 VLK1

LL Blade dresser
Standard specifications:
L3T1-0803

VN1 (CBN wheel)
Standard specifications:
CBX 120 P 150 VN1KP

Metal bond rotary dresser
Standard specifications:
SD 40 Q 90 MW7

Gear Ace
(for continuous generation type gear grinding)
Standard specifications:
TA 80 I 10 VLK1P
Vol.2

Multi-layer gear grinding wheel
Standard specifications
Grinding section:
CZ 120 I 10 V700P
Polishing section: A800

Gear Ace
(for Gear Honing)
Standard specification
Resinoid-bond grinding wheel:
CXY 100 R 7 Y1605
Vitrified-bond grinding wheel:
MA/SK 100 N 6 V53

Coolant

Noritake cool
SEC-Y
(Water base coolant)

Noritake cut
0091
(Oil base coolant)

Noritake cool
SEC-Y
(Water base coolant)

Noritake cool
SEC-Y
(Water base coolant)

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Noritake cut
0091
(Oil base coolant)

Filtration

Epoch separator

Combination Filtration System
Filtration configuration:
Magnetic separator + Paper Filter

A-0 filter

Epoch separator

Epoch separator

Case of using oil base coolant

Lambda filter system

Case of using water base coolant

Epoch separator

Magnetic separator tank unit

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