# **KORLOY High Pressure Coolant**

# **KHP Coolant** (ISO Turning Holder)



- 300% increased productivity on Inconel machining vs. low pressure coolant system
- Cooling, tool life, and chip control are improved by the high pressure coolant multi-directional injection system



TECH-NEWS

# High pressure coolant for inconel machining **KHP Coolant**

The HRSA (Inconel, titanium and stainless steel) have high strength and low thermal conductivity used in the space, aircraft, and offshore machining industries, results in structure failures causes chipping on the cutting edge due to heat shock and work hardening and decreases tool life rapidly in machining.

The existing coolant spraying to wide parts is not able to reduce the focused heat on the cutting part in HRSA machining effectively. Therefore, to improve the productivity with high efficient cooling, a solution is needed. That is spraying the high pressure coolant directly on the cutting edge. KHP Coolant will have the optimal distance between the insert cutting edge and the jet orifice, the ideal place of the streamlined jet orifice of the coolant. KORLOY's new KHP sprays high pressure coolant enhancing chip control and wear resistance.

KHP Coolant's sliding clamp system provides easy change of inserts and optimal nozzle cooling.

KHP Coolant provides the best solution meeting the customers' needs with high productivity and highly precise machining, by reducing workpiece damage by limiting fracture of insert, and long chips, for heat removal in HRSA machining.



### High productivity

- Tested up to 300% increased tool life comparing to machining with low pressure coolant system
- Increased cutting speeds and high feeds

### Excellent coolant effect

- Direct spraying coolant on the edge of insert and on the top and bottom sides of insert

### Improved chip control

- Better chip evacuation

### Easy to clamp

- Sliding clamp system

# **KHP** for ISO turing

Code system





- The optimal distance between the insert and the jet orifice and the ideal place of the jet orifice
- Minimized loss of coolant pressure due to streamlined design of internal path
- Easy to clamp an insert for sliding clamp system



The original position

of water clamp









and Oval ving

### [MAX 300 bar]

Workpiece	The minimum pressure	The maximum pressure
Р	50	
М	70	
К	60	300
Ν	50	
S	70	

# <section-header>

- PCLNR/L2525-M12-KHP
- PDJNR/L2525-M1504-KHP
- PDJNR/L2525-M1506-KHP
- PWLNR/L2525-M08-KHP





### 4 | KHP Coolant

# Performance evaluation

### Wear resistance

Workpiece

HRSA (Inconel718, HRC42) vc (m/min) = 50, fn (mm/rev) = 0.25, ap (mm) = 2, wet (70 bar)

- Cutting conditions
- Tool



[KORLOY]



[Competitor B]





[Competitor C]



Increased tool life up to 60% compared to competitor's in HRSA (Inconel etc.) machining

Decreased notch wear and wear on the nose radius and increased chipping resistance

### **Chip control**

Workpiece

HRSA (Inconel718, HRC42)

- Cutting conditions vc (m/min) = 50
- Tool

Insert CNMG120408-VP4 (PC8115)

Holder PCLNR2525-M12-KHP



- Preventing early fracture of the tool and workpiece due to long chip
- ▶ Longer tool life and improved chip control with direct spraying coolant to the nose R of the insert instead of spraying on the top and bottom sides of the insert

# Holder selection guide - KHP for ISO turning - Lever lock system - Double clamp system - Screw on system - Multi lock system KHP for ISO turning





Tools	Productivity	Tool life	High speed	High feed	Chip control
KHP for ISO turning	‴ ★★★★	****	****	****	****
Lever lock system	**	**	***	**	**
Double clamp system	**	***	***	***	**
Screw on system	**	**	*	**	**
Multi lock system	**	**	**	**	**

# **Application examples**

### HRSA (Inconel718, HRC42)

Workpiece use

Aerospace turbine case

 Cutting conditions • Tool

vc (m/min) = 50~80, fn (mm/rev) = 0.25, ap (mm) = 2, wet (70 bar) Holder PCLNR2525-M12-KHP

Insert CNMG120408-VP4 (PC8115)





▶ 67% longer tool life per corner

HRSA (Inconel718, HRC42)

- Workpiece use
- Cutting conditions vc (m/min) = 50~80, fn (mm/rev) = 0.25, ap (mm) = 2, wet (70 bar)
- Tool

Insert CNMG120408-VP4 (PC8115)

Aerospace turbine disc

Holder PCLNR2525-M12-KHP

400









KHP Coolant

(14 min. machining)

20

15

67%

improved

Machining time (min)

### HRSA (Inconel718, HRC42)

- Workpiece use
  - Aerospace turbine spool

 Cutting conditions vc (m/min) = 50~80, fn (mm/rev) = 0.25, ap (mm) = 2, wet (70 bar)

• Tool

Insert CNMG120408-VP4 (PC8115)

Holder PCLNR2525-M12-KHP



▶ 100% longer tool life per corner

# Application range





# Grade line-up





### [Chip breaker comparison (HRSA/Titanium)]

Application	KORLOY	Competitor A	Competitor B	Competitor C	Competitor D	Competitor E	Competitor F	Competitor G
Roughing	VP4	SMR	RS, GJ	TF	MS	ET	MR4	NRT, NRS
Medium cutting	VP3	SM	MS	VL	MU	EM	MR3	NMS
Medium cutting to finishing	VP2	NGP	MJ	PP	TK	ML	MF1	NMT
Finishing	VP1	SF	LS, FJ	SF	MQ	EA	M1	NFT

## [Grade comparison (HRSA)]

ISO	KORLOY	Competitor A	Competitor B	Competitor C	Competitor D	Competitor E	Competitor F	Competitor G
<b>S</b> 05	PC9105	905E	MP9005	10000	DD1205			
305	F00103	3001	VP05RT	10000	FNI303	TTEOOO	TS2000	WSM10
S10	PC8110	GC1105	VP10RT	IC907	PR1310	110000		
S15	PC8115	GC1115	MP9015	-	-			

# [Grade comparison (Titanium)]

ISO	KORLOY	Competitor A	Competitor B	Competitor C	Competitor D	Competitor E	Competitor F	Competitor G
S05	H01	-	-	-	-	-	-	-
S10	H05	H13A	MT9015	IC20	-	TT5080	THR	WS10
015	PC5300	001105	DTOO15	IC908	PR1125	TT9030	CP500	WCM00
515		601125	R19015		PR1325	TT9080	TS2500	VVSIVI20

# How to clamp the KHP Coolant

- 3 types of installation systems makes clamping easy.
- The banjo type hose provides wider area for machining than other types.



\* Blank including a fixed oil seal provides easy clamping.

\* Banjo screws provide easy clamping and clamping a holder to the turning machine with various types of blanks.

# Components of KHP Coolant

- The components of high pressure coolant are sold separately.
- Various components are available according to different machining sites and uses machining with high pressure coolant.

Designation	Shape		Hose length	High pressure hose	Blank	Adaptor	Banjo screw	Copper washer	Pic No.
HPH3/8UNF-200-SET	S	S	200 mm						4
HPH3/8UNF-250-SET	H	9	250 mm			2 LA	-		
HPH3/8UNF1/8PF-200-SET	S	В	200 mm			1	1 🗆	0 54	0
HPH3/8UNF1/8PF-250-SET	(H)	E#O	250 mm		TEA	I EA	I EA	3 EA	2
HPH1/8PF-200-SET	В	В	200 mm				2 EA	5 EA	3
HPH1/8PF-250-SET	0=	FO	250 mm	-		-			



PDJNR/L

								)							B type insert					
		Ste	ock								Lever	Screw	Shim	Shim pin	Shim pin punch	Clamp	Clamping screw	Oil seal	Plug	Wrench
De	esignation	R	L	Н	W	L	S	h	Q	Insert	ß	o Di		7		Ð	O TAMA	Ø	6	
PDJNR/L	2525-M11-KHP			25	25	150	32.25	25	42	DN1104	LV3AN	VHX0617N	SD32N	SP3	LSPS3	HPCR/L-H	MHB0415	HPO7S	KHA0404- NYLOCK	HW20L HW25L HW30L
	2525-M1504-KHP	•	•	25	25	150	32.25	25	42	DN1504	LV4BN	VHX0821N	SD43N	SP4N	LSPS4	HPCR/L-H	MHB0415	HPO7S	KHA0404- NYLOCK	HW20L HW30L
	2525-M1506-KHP	•	•	25	25	150	32.25	25	42	DN1506	LV4BN	VHX0821N	SD42N	SP4N	LSPS4	HPCR/L-H	MHB0415	HPO7S	KHA0404- NYLOCK	HW20L HW30L
			1	1		1		1	1	1	1		1	1	1	I	1	(	Stoc	k items

# **PSSNR/L**





# SRGCR/L



# SVJBR/L



# Parts

Parts	Designation	SI	nape of parts
Adaptor	HPA3/8UNF1/8PF		G1/8 (PF1/8) UNF3/8
Blank	HPB1/8PF		G1/8 (PF1/8)
Banjo screw	HPZ1/8PF		G1/8 (PF1/8)
Copper washer	HPW1/8PF	0	Internal diameter Ø10

# High pressure hose

The sha	pe of the high pressure ho	Length	Standard S	Standard B		
Straight to straight			200 mm	LINE3/8	_	
(HPH3/8UNF)	\$ <del>[]</del>		250 mm			
Straight to banjo	UNF3/8	Internal diameter Ø10	200 mm	UNF3/8	Internal diameter Ø10	
(HPH3/8UNF1/8PF)	\$ <b>∰===-</b> ==	<u></u> -⊡©⊕ B	250 mm			
Banjo to banjo	Internal diameter Ø10	Internal diameter Ø10	200 mm		Internal diameter	
(HPH1/8PF)	B @=====	<u></u> 0 <b>@</b> B	250 mm	-	Ø10	

### Notice

- Use a standard spanner in clamping.
- Be careful of spraying coolant injected by the residual pressure in using high pressure coolant.
- Clamp the parts tightly.
- Clean the turning machine before clamping.
- The O-ring is included in the parts. Don't have to purchase it separately.

# KHP for automatic lathe machining



 $\ensuremath{\times}$  Quick adapter and quick hose are sold separately.

# Features

- High pressure coolant holder for high productivity of precise parts machining on automatic lathe
- Improved cooling and chip control due to injecting coolant through two holes to the main cutting edge and nose R concentrically
- Two holes with different injection angles each other increase chip control
- Easy clamping system of quick hose adapter and quick hose provides convenient using

### Injection nozzle

- Optimal coolant nozzle size
- Exact injection point of the major cutting edge and nose R
- Improved chip control due to height difference of injection



Workpiece	The minimum pressure	The maximum pressure
Р	100	
М	120	
K	110	300
N	100	
S	120	

### -Performance evaluation



2 pointed injection with different angles

.

### Chip control

Workpiece

Workpiece

• Tool

Cutting conditions

Stainless steel (X5CrNi18-9)

Insert CCGT09T302MFN-VP1 (PC8110)

Stainless steel (X5CrNi18-9)

ap (mm) = 0.5, wet (120 bar)

vc (m/min) = 169, fn (mm/rev) = 0.15,

CCGT09T302MFN-VP1 (PC8110)

SCLCR1212-X09A-KHP

• Cutting conditions vc (m/min) = 169, fn (mm/rev) =

Insert

Holder

• Tool

vc (m/min) = 169, fn (mm/rev) = 0.15, ap (mm) = 0.5, wet (120 bar)







# SDJCR/L



• : Stock items

# SVJCR/L



• : Stock items

# Parts

Parts	Designation	SI	nape of parts
Adaptor	HPA3/8UNF1/8PF		G1/8 (PF1/8) UNF3/8
Blank	HPB1/8PF	CEE	G1/8 (PF1/8)
Quick adapter	HPAQ5/16UNF	0	UNF5/16 QUICK

# High pressure hose

The sha	pe of the high pressure hose	Length	Standard Q	Standard S
Quick to straight (HPHZ5/16UNF3/8UNF-500)		500 mm	UNF5/16	-

# Recommended high pressure pump system

- These 2 recommended systems
- Customers can select a filter, pressure, and discharge according to their cutting conditions

Brand	Kemtech	
System	VF-series	BF-series
Design		
Model no.	VF 70-60 DF	CF 35-25
Filter	Double bag filter	Cyclone filter
Pressure (bar)	70 (Standard pressure)	35 (Standard pressure)
Discharge ( <i>l</i> /min)	60 (Standard discharge)	25 (Standard discharge)
Features	- Suitable for high precision HRSA machining - Variable pressure for the dia. of tool	<ul> <li>Suitable for high precision HRSA machining</li> <li>Variable pressure for the dia. of tool</li> <li>Applying a cyclone filter</li> <li>No filter supplies</li> </ul>
Automatic pressure control	0	0
Options	- Chiller, Inverter multistage control	- Chiller, Inverter multistage control - Applicable tank, the attached model

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