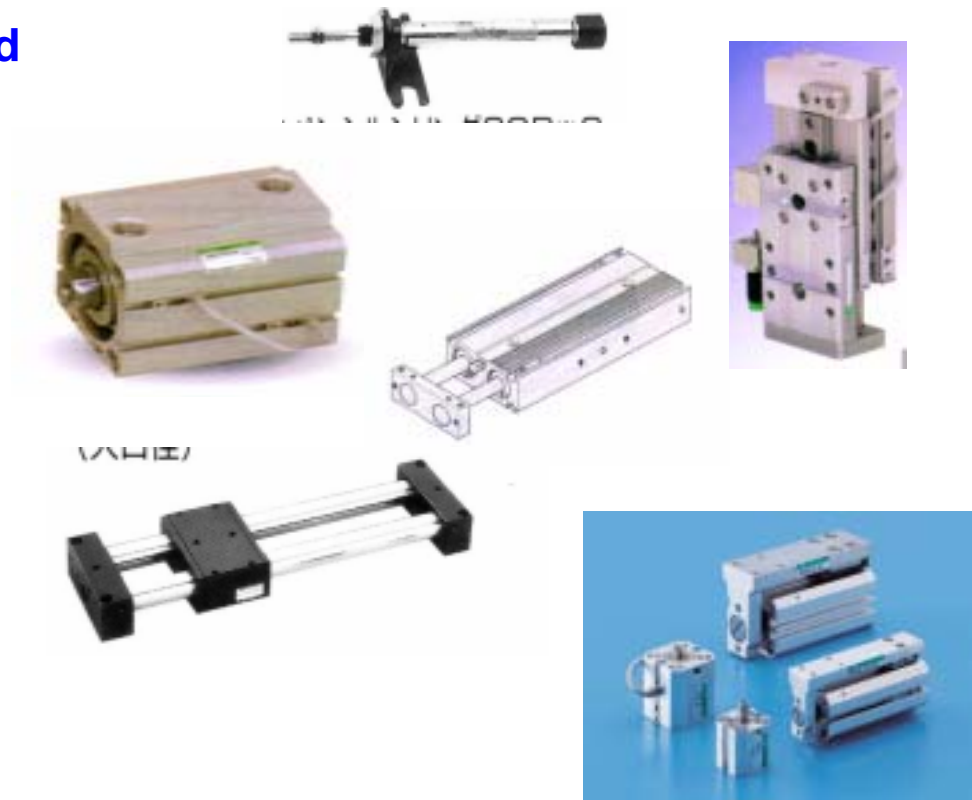


Creep Speed Cylinder F-series

Creep speed = Ultra low speed

- Purpose of development**
- Specification**
- Performance data**
- Application**



Engineering Department

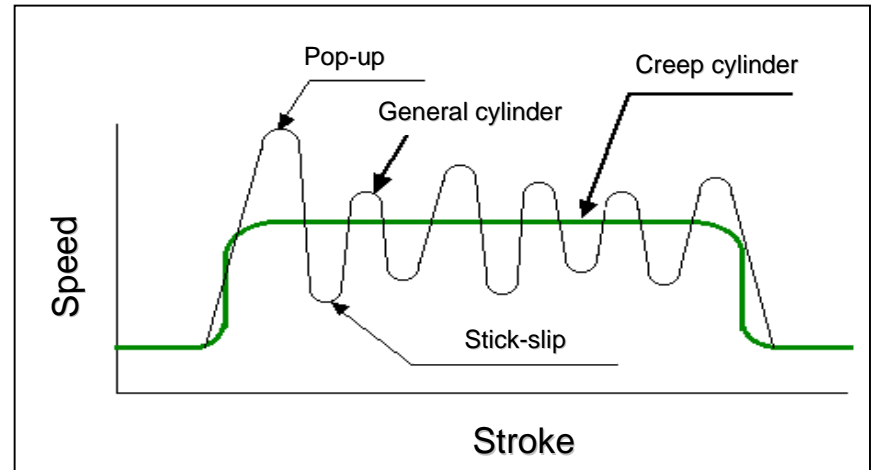
Inuyama Operation, Production and Engineering Division




Purpose of development

Malfunction on cylinder operation

- (1) Stick-slip at ultra low speed
- (2) Pop-up at operation start
(Monday disease)
- (3) Impact absorption at stroke end
- (4) Impact noise at stroke end



Recognized as usual phenomena, but with new technologies, solve malfunction

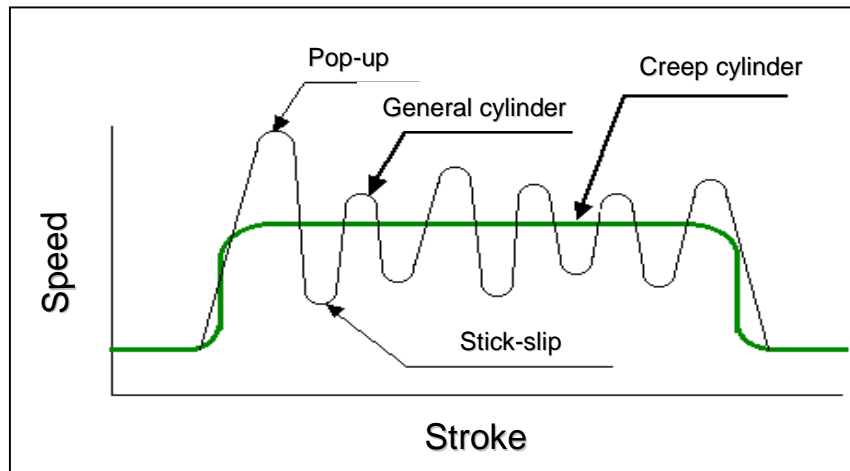
Purpose of development

Creep speed cylinder

(1) Cylinder to solve stick-slip at low speed

Solve stick-slip and use together with meter-in/our flow controls

(2) Prevent from pop-up at start operation



Seal structure Feature

Reconsideration of lubrication characteristic

Development of Sliding

**Packing
Tube
Grease**

**(Hardness and special surface treatment)
(Special surface treatment)
(Special grease)**

Features

**Can be operated with ultra low speed up to 1mm/s
Stable operation without stick-slip**

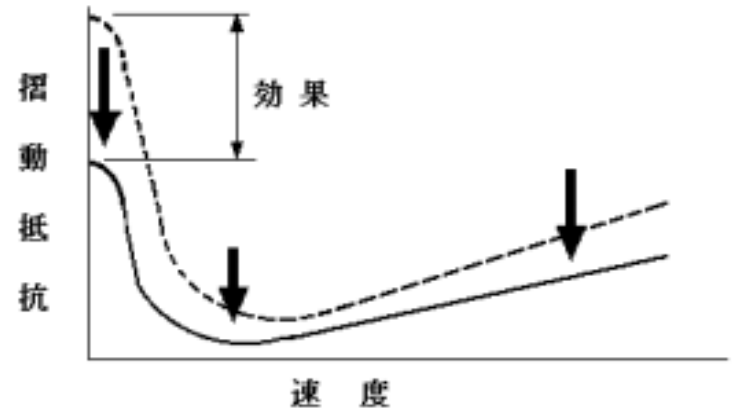
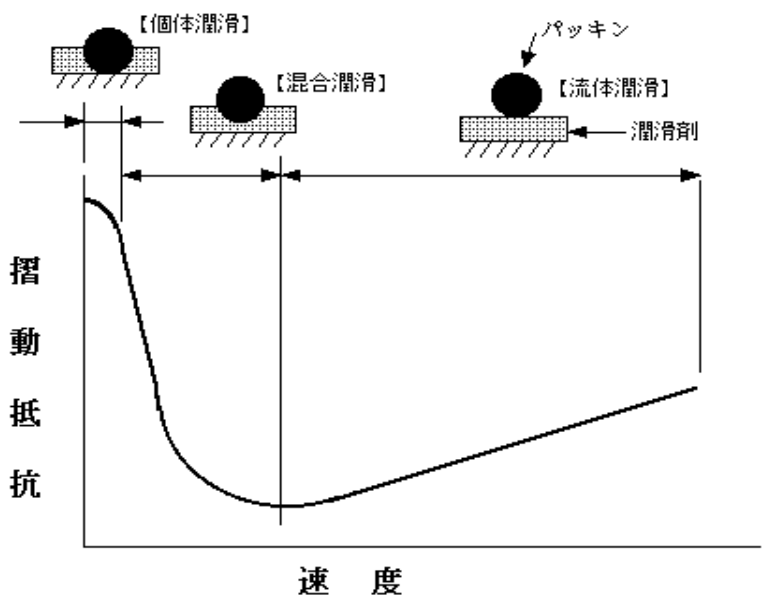
**Soft movement at stroke end
Smooth movement without pop-up**



Reconsideration of lubrication

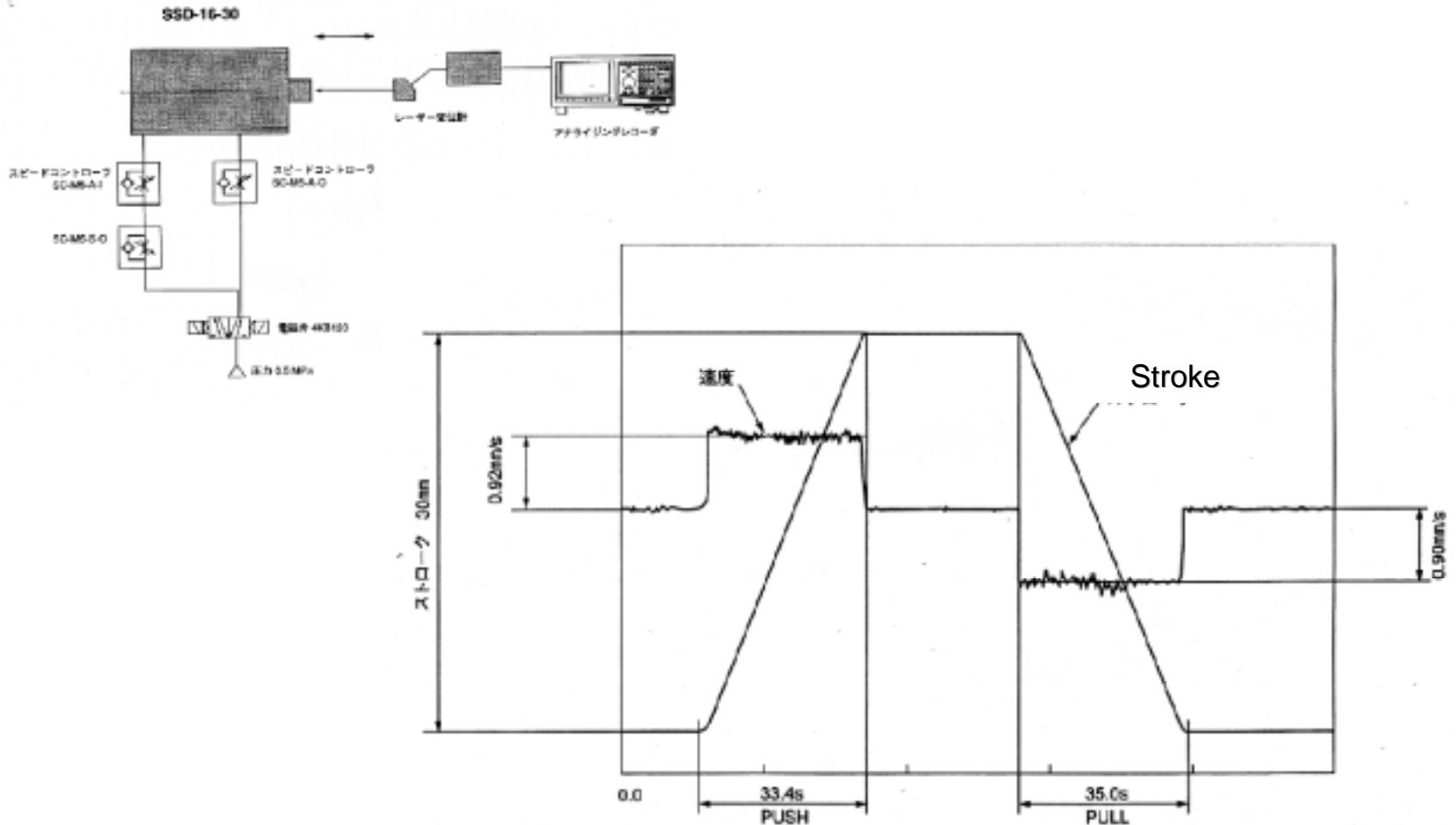
Reconsideration of lubrication

【Stribeck curve】
Special surface treatment
Special grease

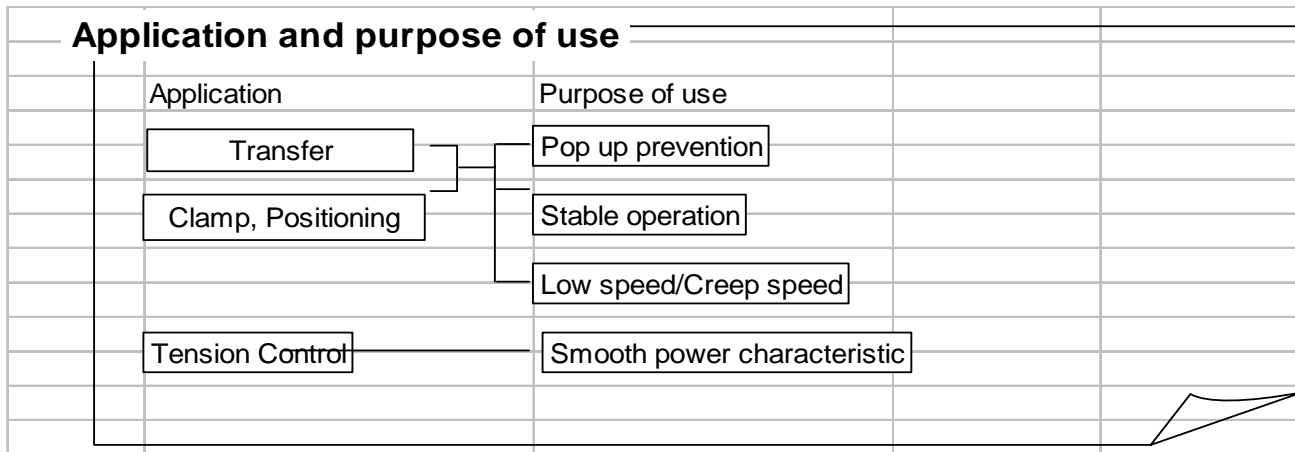


Performance data

Less resistance under pressure

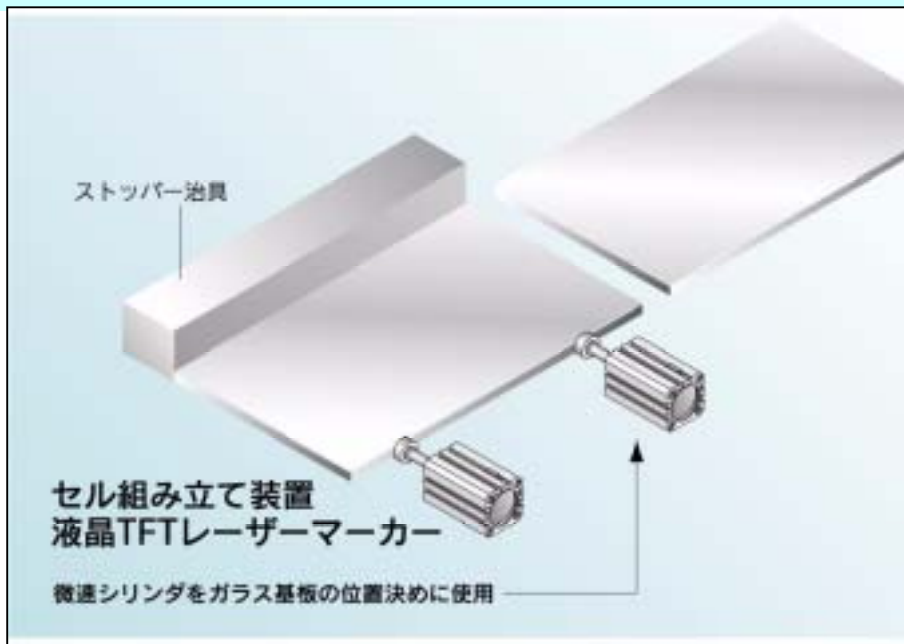


Applications





Applications



In the event that cylinder speed change affects work piece

In case of using on ultra low speed range (1mm/s-)

Applications

Equipmwnnt	Application	Purpose of use	Condition
CVD	Cassette carrier		Meter-in circuit
	Horizontal transfer	Pop up prevention	5 mm/s
	Lift transfer		5 mm/s
	Open/Close of cover	stable operation	Less 50 mm/s
	Heat resistance	Vibration prevention	
Hard disk Inspection	MR head clamping	Pop up prevention	Meter-in/out circuit 20 mm/s
MR head polishing	MR head polishing	Micro-load control	Press pressure 0.025 ~ 0.5MPa
Offset printing	Printing plate	Pop up prevention	Synchronous control
	Loading/unloading		
Auto print plate changing equip.	Printing unit	2pcs. Synchronous control	Low speed operation
IC Inspection Equipment	Pulling tray	Pop up prevention	Cylinder speed
		Sticking prevention	10-25mm/s at pressure
			0.45MPa

Cylinder series

Pencil Cylinder	SCPD2 series	Super rodless cylinder	MRL2 series
Tight Cylinder	CMK2 series	Linear slide cylinder	LCS series
Compact direct cylinder	MDC2 series	Super twinrod cylinder	STR2 series
Super Mount cylinder	SMD2 series	Guide cylinder	STS/L series
Super Compact cylinder	SSD series	Table type rotary actuator	GRC series