

SFP-550

Polishing Process Manual



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INTRODUCTION

This manual covers polishing conditions and procedures with SFP-550 Polishing Machine. The polishing conditions in this manual are standard and recommendable for the polishing applicable to our optical Zirconia ferrule. Polishing conditions need to be changed applying to each connector type, ferrule shape and material.

NOTE

Before polishing, also read Operating Manual and Maintenance Manual of SFP-550 along with this manual.

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§1 Introduction of IPC Holder

Please make sure that Zr ferrule does not have any epoxy or debris on side face. These epoxy or debris may affect polishing performance because of changing spring pressure from IPC (Independent Pressure Control) system. In addition, to clean ferrule insertion hole is necessary as regular maintenance to avoid debris to stick inside the hole. Please use HCB-250 (for 2.5mm hole) or HCB-125 (for 1.25mm hole) brush with IPA for cleaning. After brushing, blow compressed air to the cleaned insertion hole.

* Cleaning Method Using HCB-250 / 125

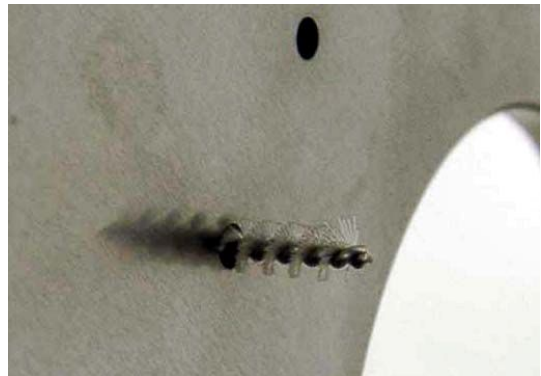
- 1) Insert the brush into the hole from upper side of the holder. (Pic.1).
- 2) Keep inserting the brush to the other side (Pic. 2).
- 3) Repeat this cleaning method several times until the hole is cleaned up. Try to put alcohol to the brush for cleaning if foreign substances are still adhered in spite of many trials.

Pic. 1



Using brush for cleaning

Pic. 2



Viewed from bottom

§2 Instruction of Polishing Film / Pad

2-1) Rubber pad (PR5X-500-**)

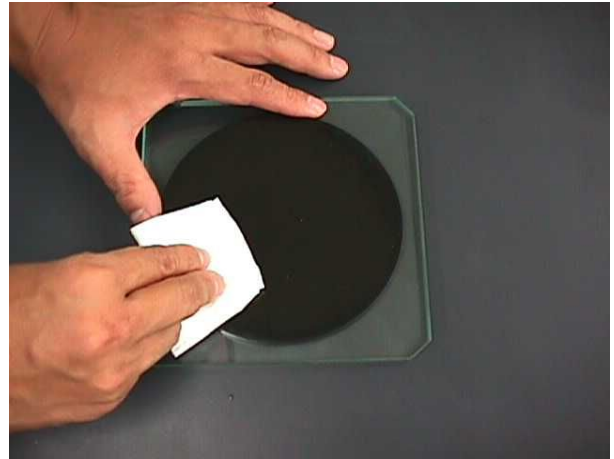
To avoid peeling problem during polishing, please follow the instruction below when you attach polishing film to rubber pad.

- 1) Place rubber pad on flat & solid object such as glass plate (Pic. 3).
- 2) Place a few drops of PURIFIED WATER (Pic. 3) and wipe with lint-free tissue to remove moisture (Pic. 4).
- 3) Place the polishing film on the rubber pad and remove bubbles between the pad and the film by roller (Pic. 5).

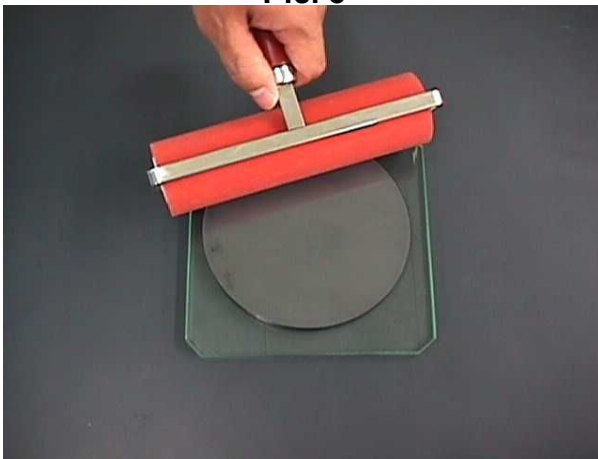
Pic. 3



Pic. 4



Pic. 5



2-2) Sponge pad (PS5X-500-00)

Sponge pad is necessary for adhesive removal step to reduce the grinding pressure to avoid a fiber crack problem. We recommend using “repositionable spray glue” to attach polishing film to the sponge pad. The spray glue is durable and can be used several times with one spray brow.

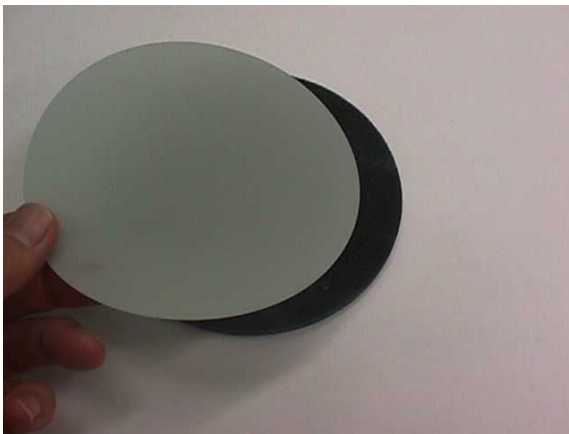
Pic. 6



Pic. 7



Pic. 8



§3 D 2.5mm Pre-radius Ferrule, HPC Convex Polishing

Polishing Holder (Standard IPC Holder):

PH55-FF-20 (D 2.5mm Ferrule)

PH55-FP-20 (FC Plug)

PH55-CP-20 (SC Plug)

PH55-SP-20 (ST Plug)

POLISHING PROCESS	POLISHING CONDITIONS				
	POLISHING PAD	POLISHING FILM (service life)	POLISHING LIQUID	POLISHING TIME (min)	PRESSURE
ADHESIVE REMOVAL	PS5X-500-00	GA5D (5)	NONE	0.5	NONE
FIRST POLISHING	PR5X-500-80	DR5D-9u (30)	PURIFIED WATER	0.5	AFTER 10 TURNTABLE REVOLUTIONS
SECOND POLISHING	PR5X-500-80	DJ5D-1u (30)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS
FINAL POLISHING	PR5X-500-80	XF5D (7)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS

Note: All polishing times will be half of the above when the number of attached ferrules is 5 or less.

§4 D 1.25mm Ferrule, HPC Convex Polishing

Polishing Holder (Standard IPC Holder):

PH55-FLM-24 (LC / MU Ferrule, Coupling nut type)

PH55-FLM-16 (LC / MU Ferrule, Post-type)

PH55-PL-24 (LC Plug)

PH55-PM-24 (MU Plug)

POLISHING PROCESS	POLISHING CONDITION				
	POLISHING PAD	POLISHING FILM (service life)	POLISHING LIQUID	POLISHING TIME (min.)	PRESSURE
ADHESIVE REMOVAL	PR5X-500-90	GA5D (5)	NONE	0.5	NONE
FIRST POLISHING	PR5X-500-85	DH5D-3 μ (30)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS
SECOND POLISHING	PR5X-500-85	DJ5D-1 μ (30)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS
FINAL POLISHING	PR5X-500-85	XF5D (10)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS

Note: All polishing times will be half of the above when the number of attached ferrules is 5 or less.

§5 D 2.5mm Ferrule APC Polishing (w/o Tuning)

Polishing Holder (Standard IPC Holder):

	Connector Type	APC Type	Pedestal Diameter	Key Width	Chamfer Angle
PH55-FF8A-18-1.3	APC Ferrule	Step	1.4mm	1.3mm	---
PH55-FF8A-18-1.5	APC Ferrule	Step	1.4mm	1.5mm	---
PH55-FF8C-18-1.3	APC Ferrule	Conical	1.0mm	1.3mm	35 degree
PH55-FF8C-18-1.5	APC Ferrule	Conical	1.0mm	1.5mm	35 degree
PH55-FP8R-18-I	FC/APC	Step	1.4mm	2.00mm	---
PH55-FP8N-18-I	FC/APC	Step	1.4mm	2.14mm	---
PH55-FP8RC-18-I	FC/APC	Conical	1.0mm	2.00mm	35 degree
PH55-FP8NC-18-I	FC/APC	Conical	1.0mm	2.14mm	35 degree
PH55-CP8A-18	SC/APC	Step	1.4mm	---	---
PH55-CP8C-18	SC/APC	Conical	1.0mm	---	35 degree

POLISHING PROCESS	POLISHING CONDITION				
	POLISHING PAD	POLISHING FILM (service life)	POLISHING LIQUID	POLISHING TIME (min.)	PRESSURE
ADHESIVE REMOVAL CONVEX FORMING	PR5X-500-75	GA5D (1)	PURIFIED WATER	1.0	AFTER 10 TURNTABLE REVOLUTIONS
FIRST POLISHING	PR5X-500-75	DA5D (30)	PURIFIED WATER	1.0 to 1.5 (Note 1)	AFTER REVOLUTION STARTS
SECOND POLISHING	PR5X-500-75	DR5D-9 μ (30)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS
THIRD POLISHING	PR5X-500-75	DJ5D-1 μ (30)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS
FINAL POLISHING	PR5X-500-75	XF5D (10)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS

Note 1: Polishing time for DA5D is 1.0 min. up to 15 times and 1.5 min. after 15 times

Note 2: All polishing times will be half of the above when the number of attached ferrule is 5 or less.

Note 3: For conical ferrule, the above holders might cause apex offset depending on conical ferrule tip dimension. Then you need to have custom design holder as per ferrule tip dimension.

§6 LC / MU Plug APC Polishing (w/o Tuning)

Polishing Holder (Standard IPC Holder):

PH55-PL8A-20 (LC/APC Plug)

PH55-PM8A-20 (MU/APC Plug)

POLISHING PROCESS	APC POLISHING CONDITION				
	POLISHING PAD	POLISHING FILM (service life)	POLISHING LIQUID	POLISHING TIME (min)	PRESSURE
ADHESIVE REMOVAL CONVEX FORMING	PR5X-500-70	DA5D (30)	PURIFIED WATER	0.5 to 1.0 (Note 1)	AFTER 20 TURNTABLE REVOLUTIONS
FIRST POLISHING	PR5X-500-70	DR5D-9 μ (30)	PURIFIED WATER	0.5	AFTER REVOLUTION STARTS
SECOND POLISHING	PR5X-500-70	DJ5D-1 μ (30)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS
FINAL POLISHING	PR5X-500-70	XF5D (10)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS

Note 1: Continue polishing until convex is completely formed

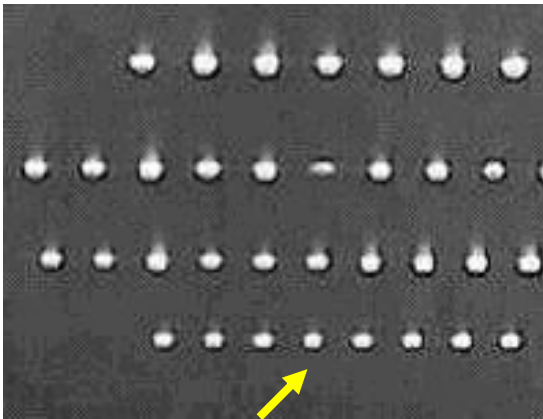
Note 2: All polishing times will be half of the above when the number of attached ferrules is 5 or less.

Polishing Process for Mega-axis Holder

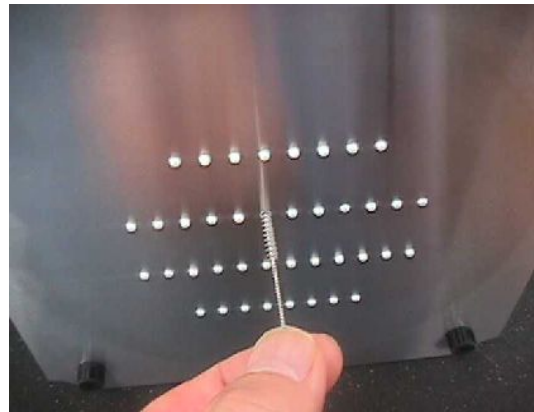
§7 Instruction of Mega-axis IPC Holder

Please make sure that Zr ferrule does not have any epoxy or debris on side face. These epoxy or debris may affect polishing performance because of changing spring pressure from IPC (Independent Pressure Control) system. In addition, to clean ferrule insertion hole is necessary as regular maintenance to avoid debris to stick inside the hole. Please use HCB-250 (for 2.5mm hole) or HCB-125 (for 1.25mm hole) brush with IPA for cleaning. After brushing, blow compressed air to the cleaned insertion hole.

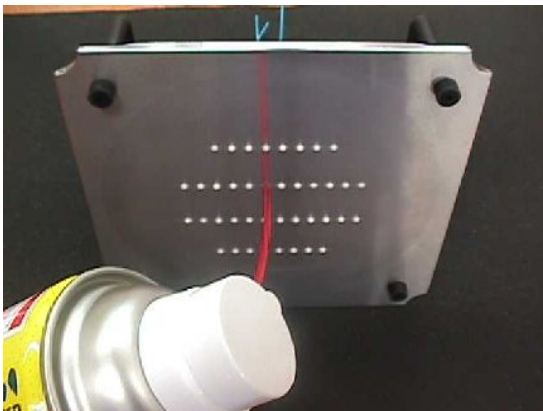
Pic. 1



Pic. 2



Pic. 3



§8 D 2.5mm Pre-radius Ferrule, HPC Convex Polishing

Polishing Holder (Mega-axis IPC Holder):

PH55-FF-40N (D 2.5mm Ferrule)

PH55-CP-32N (SC Plug)

PH55-SP-28N (ST Plug)

POLISHING PROCESS	POLISHING CONDITIONS				
	POLISHING PAD	POLISHING FILM (service life)	POLISHING LIQUID	POLISHING TIME (min)	PRESSURE
ADHESIVE REMOVAL	PS5X-500-00	GA5D (5)	NONE	0.5	NONE
FIRST POLISHING	PR5X-500-75	DR5D-9u (30)	PURIFIED WATER	0.5	AFTER 10 TURNTABLE REVOLUTION
SECOND POLISHING	PR5X-500-75	DJ5D-1u (15)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS
FINAL POLISHING	PR5X-500-75	XF5D (5)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS

Note: All polishing times will be half of the above when the number of attached ferrules is 5 or less.

§9 D 1.25mm Ferrule, HPC Convex Polishing

Polishing Holder (Mega-axis IPC Holder):

PH55-PL-40N (LC Plug)

PH55-PM-40N (MU Plug)

PH55-FLM-40N (LC / MU Ferrule) *

*Note: For LC ferrule polishing, please insert 4pcs of 0.6mm spacers between the holder plate and the spring plate. The spacers come with the holder.

POLISHING PROCESS	POLISHING CONDITION				
	POLISHING PAD	POLISHING FILM (service life)	POLISHING LIQUID	POLISHING TIME (min.)	PRESSURE
ADHESIVE REMOVAL	PR5X-500-90	GA5D (5)	NONE	0.5	NONE
FIRST POLISHING	PR5X-500-85	DH5D-3 μ (20)	PURIFIED WATER	1.0	AFTER REVOLUTIONS STARTS
SECOND POLISHING	PR5X-500-85	DJ5D-1 μ (20)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS
FINAL POLISHING	PR5X-500-85	XF5D (5)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS

Note: All polishing times will be half of the above when the number of attached ferrules is 5 or less.

§10 SC Plug APC Polishing (w/o Tuning)

Polishing Holder (Mega-axis IPC Holder) :

PH55-CP8A-32N (SC/APC Plug with Step ferrule, Pedestal D 1.4mm)

PH55-CP8C-32N (SC/APC Plug with Conical ferrule, Pedestal D 1.0mm,
 Chamfer angle 35-deg)

PH55-FF8C-40N-1.3 (Conical ferrule 8-deg APC, Pedestal D 1.0mm,
 Chamfer angle 35-deg, Key width 1.3mm)

POLISHING PROCESS	POLISHING CONDITION				
	POLISHING PAD	POLISHING FILM (service life)	POLISHING LIQUID	POLISHING TIME (min.)	PRESSURE
ADHESIVE REMOVAL CONVEX FORMING	PR5X-500-75	GA5D (1)	PURIFIED WATER	1.0	AFTER 10 TURNTABLE REVOLUTIONS
FIRST POLISHING	PR5X-500-75	DA5D (30)	PURIFIED WATER	1.0 to 1.5 (Note 1)	AFTER REVOLUTION STARTS
SECOND POLISHING	PR5X-500-75	DR5D-9 μ (30)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS
THIRD POLISHING	PR5X-500-75	DJ5D-1 μ (15)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS
FINAL POLISHING	PR5X-500-75	XF5D (5)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS

Note 1: Polishing time for DA5D is 1.0 min. up to 15 times and 1.5 min. after 15 times

Note 2: All polishing times will be half of the above when the number of attached ferrules is 5 or less.

Note 3: For conical ferrule, the above holders might cause apex offset depending on conical ferrule tip dimension. Then you need to have custom design holder as per ferrule tip dimension.

§11 LC Plug APC Polishing (w/o Tuning)

Polishing Holder (Mega-axis IPC Holder):

PH55-PL8A-40N (LC/APC Plug)

POLISHING PROCESS	APC POLISHING CONDITION				
	POLISHING PAD	POLISHING FILM (service life)	POLISHING LIQUID	POLISHING TIME (min)	PRESSURE
ADHESIVE REMOVAL CONVEX FORMING	PR5X-500-70	DA5D (30)	PURIFIED WATER	0.5 to 1.0 (Note 1)	AFTER 20 TURNTABLE REVOLUTIONS
FIRST POLISHING	PR5X-500-70	DR5D-9 μ (30)	PURIFIED WATER	0.5	AFTER REVOLUTION STARTS
SECOND POLISHING	PR5X-500-70	DJ5D-1 μ (15)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS
FINAL POLISHING	PR5X-500-70	XF5D (5)	PURIFIED WATER	1.0	AFTER REVOLUTION STARTS

Note 1: Continue polishing until convex is completely formed.

Note 2: All polishing times will be half of the above when the number of attached ferrules is 5 or less.

§12 Service Life of Polishing Films

Polishing Films	Application	Service Life (Usable times)	Polishing Material	Diameter of polishing particles
GA5D	Adhesive Removal, Rough Polishing	1-5	SiC	Large ↓ Small
GC5D	Adhesive Removal, First Polishing	1		
GI5D	Second Polishing	1		
GK5D	Second Polishing	1		
DA5D	Rough Polishing	15-30	Diamond	Large ↓ Small
DR5D-9μ	First Polishing	15-30		
DG5D-5μ	First Polishing	15-30		
DH5D-3μ	Second Polishing	15-30		
DJ5D-1.5μ	Second Polishing	15-30		
AR5D	First Polishing	1	Alumina	Large ↓ Small
AJ5D	Second Polishing	1		
SF5D	Final Polishing	1		
AO5D	Final Polishing	1		
XF5D	Final Polishing	5-10	SiO ₂	Fine
EF5D	Final Polishing	1	CeO ₂	Fine
CF5D	Cleaning	30	Polishing Pad	
BX5D	Polishing	3		

Note 1: Service life of films may change depending on conditions of storage or usage

Note 2: Wipe and clean the polishing films to remove polishing remaining and moisture after polishing and storage them in low humidity condition.

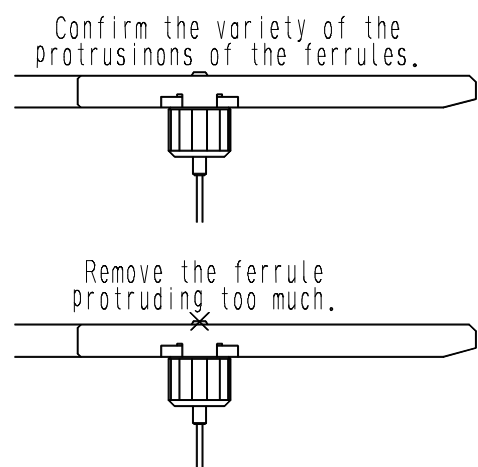
§13 Polishing Process

Polishing process is depending on each ferrule shape, material, and connector type. Polish ferrules by an appropriate polishing condition described in the former sections. The following Polishing Process is regarding to general ferrule polishing using SFP-550S

13.1 Ferrule Mounting Check

When ferrules are mounted to the polishing holder, please make sure that the tip of ferrules protrude uniformly from the bottom of the holder.

A variety of the protrusions influence the quality of polishing. Confirm the protrusion of the ferrules after mounting, remove the ferrule if its protrusion length is larger or shorter than others. Especially the ferrule of short protrusion may not be mounted completely because of adhesive on the side of the ferrule. Clean the ferrule well and mount it to the holder again. Do not remove the ferrules during polishing processes.



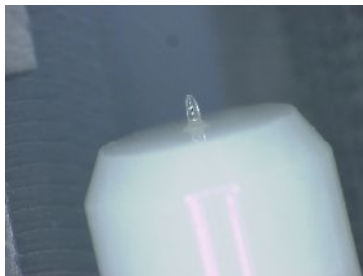
13.2 Adhesive Removal Process

Use of sponge pad in adhesive removal step helps reducing fiber crack and damages in polishing film. Adhesive removal process shall be done until adhesive is completely removed. If there is adhesive left on ferrule endface, it might lead to polishing film breakage or affect to polished endface geometry.



Pic. 10 Fiber crack

Example: amount of adhesive



Pic. 11 Not enough



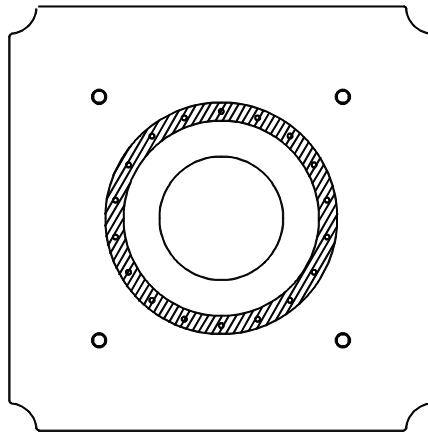
Pic. 12 Decent amount



Pic. 13: Too much

13.3 Cleaning of Polishing Holder

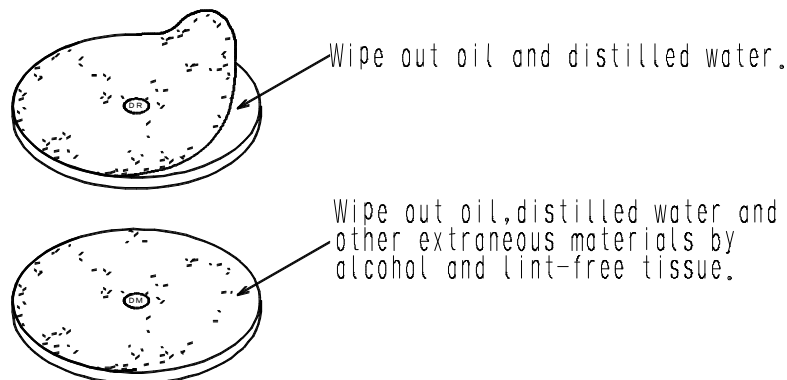
Polishing particles stuck to the polishing holder at the former polishing step may be a cause for the damage of a polishing film and scratches of the ferrule tip at the latter polishing step. After every polishing step, wipe the bottom side of the polishing holder, especially the area around the ferrule tips shown the shaded part in the bottom figure, by PURIFIED WATER and lint-free tissue.



13.4 Cleaning of Polishing Film and Polishing Pad

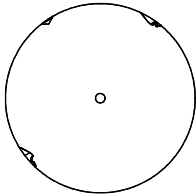
For polishing film, which has service life more than once, shall be wiped and cleaned by purified water and lint-free tissue after every use. Because remain of polished residue may cause bad polishing result. Also, when polishing liquid between the polishing pad and the film is found, clean the area between the polishing pad and film and keep the area free from the extraneous materials. Because polishing liquid between the polishing pad and the polishing film may accelerate the polishing film peeling and be cause for the bad polishing result or damage of the polishing film.

The following figure shows the area focusing on cleaning.

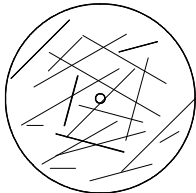


13.5 Re-polishing

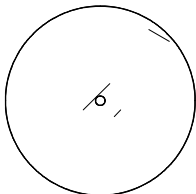
The ferrule needs to be re-polished if it has a scratch or crack of the fiber after polishing. For any polishing condition, the re-polishing follows the same steps starting from the step after adhesive removal. If the polishing result is still not in good condition, change the polishing film because of its exhaustion.



Re-polish the ferrule because of the crack of the fiber. In this case, the fiber was caught and adhesive was removed at the former polishing process. Make sure not to give the pressure suddenly at the adhesive removal step.



There are many superficial scratches on the fiber. In this case, the protrusion length of the fiber was not enough. Or change the polishing film because it is almost out of its service life.



There are slightly superficial scratches on the fiber. In this case, the cleaning of the ferrule end faces was not complete and polishing particles and dust of the former polishing process influenced the following polishing. Re-polish the ferrule starting from the final polishing. Clean the end faces of ferrules completely after every polishing process.

- **If there is no improvement with the counter plans on the above, inspect the polishing machine according to the maintenance manual.**

November 11, 2009
SFP-550 Polishing Process Manual
FP-PM55 (Rev. 6.3)