

**Fiber Optic
Preform
Manufacturing
Equipment
Total Solution**

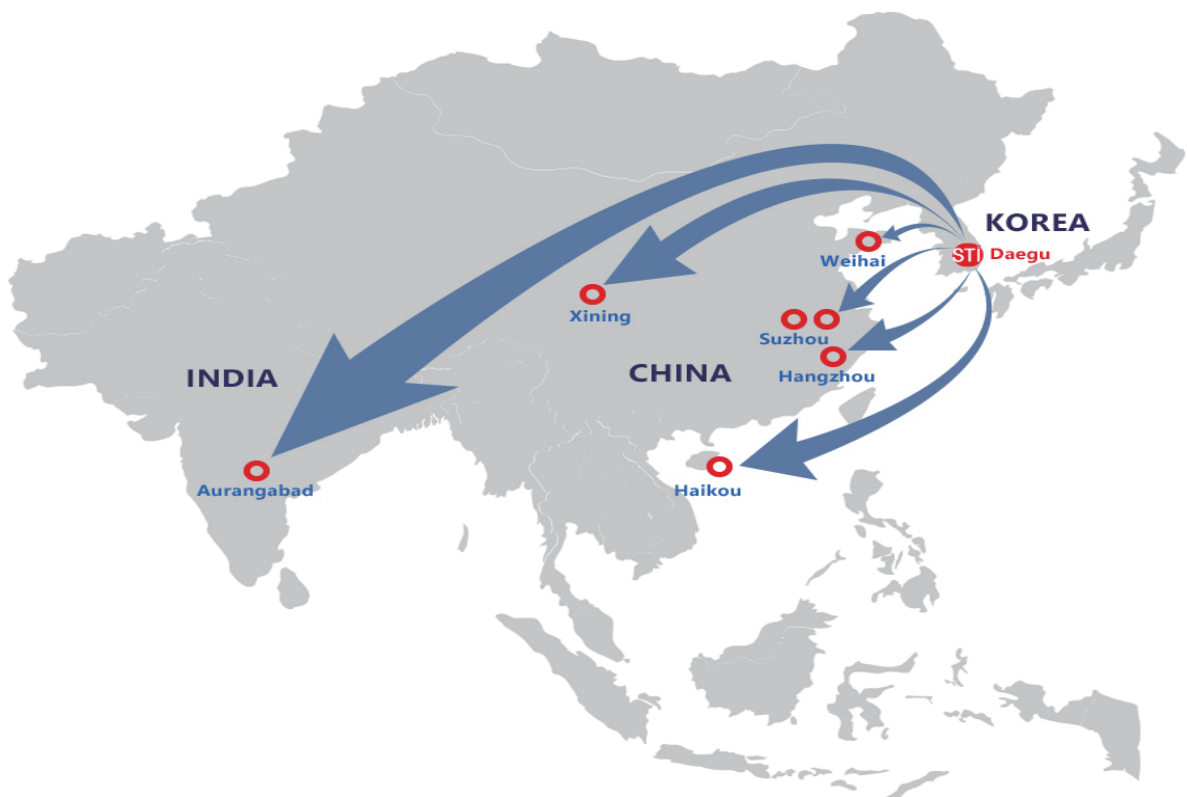
CORPORATE INFORMATION

**FIBER OPTIC PREFORM
MANUFACTURING EQUIPMENT
TOTAL SOLUTION STI**

STI maintains mass production technology of high purity preform of **LWPF**(Low Water Peak Fiber) or **ZWPF** (Zero Water Peak Fiber) by techs & equipments for manufacturing of **VAD**(Vapor Axial Deposition) core, and especially the cladding is performed by **OVD**(Outside Vapor Deposition) method for keeping **excellent productivity and cost** competitiveness compared to major rival makers.

The STI's outstanding technical standard is mainly based on durability and reproducibility reflected by top facility and technology for mass production. Among other things, **quartz torch for core and burner for cladding of high efficiency** are major points for competitiveness of technology. Through continuous research and developments, preforms of super purity and large size are undergoing exploitations and it excels global preform market.

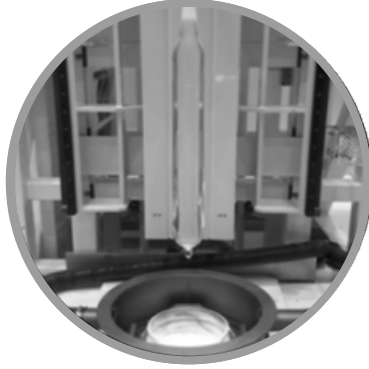
STI builds and supplies all equipment as well as those for preform and other related ones such as feeding system for raw chemical material, **scrubber that neutralizes process wastes, material conveying system etc. and also offers its most suitable technology as well as up-to-date project management** skill to clients' requirements in terms of responsible sense.



FIBER OPTIC PREFORM MANUFACTURING EQUIPMENT



VAD Core System



Core Sintering System



Core Soaking System



Elongation System



OVD Clad System



Clad Sintering System



Clad Soaking System



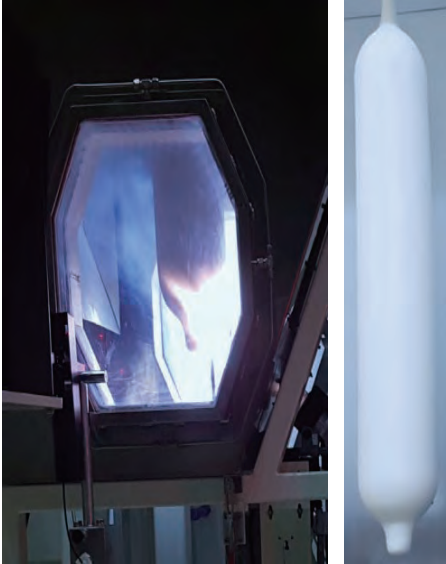
Sharpening system



Process Technology &
Project Management

CORE DEPOSITION (VAD)SYSTEM

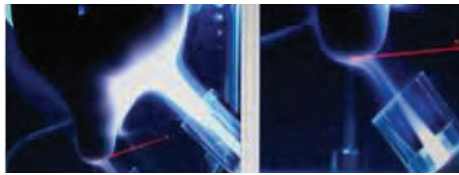
MODEL
STM - CDV - A70



DESCRIPTION

The design characteristic of the Core Deposition system is that it uses the VAD method suitable for the production of the LWPF and ZWPF optic fibers. Also, it is the equipment with the superior base material production capabilities. It consists of the vertical lathe that enables the transfer of base material in the vertical direction, the heat-resistant and corrosion-resistant deposition chamber that enables the stable deposition, high-efficiency deposition torch (quartz), high-purity gas and chemical feeder, and exhauster maintaining the static pressure.

Its operation applies the PC input/output GUI to facilitate the recipe editing, and it also applies the Siemens motion & drive, ensuring its long-term reliability. It consists of the auto-control system that enables the unmanned operation.

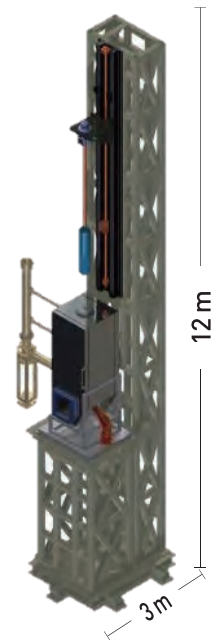


FEATURES

- Low production costs
- High quality preform(for LWPF, ZWPF)
- OH free, Bubble free
- High deposition rate

SPECIFICATION

Items	Spec(nominal)	Remarks
Machine Dim	5 m x 5 m x 12 m	
Machine(WT)	8 Ton	
Soot Preform(OD)	Ø 190 mm	Q.G (Ø 85 mm)
Soot Preform(TL)	1,300 mm	
Soot Preform(WT)	9±1 kg	
Deposition Rate	10 ±2g / min	
Number of Torch	2	
Chemical & Gases	SiCl ₄ , GeCl ₄ , CF ₄ , H ₂ , O ₂ , N ₂	
Power(Total)	80 kw	
Clean Class	# 10,000	
Capa(fkm/Machine)	3,300	
Capa(Mfkm/year)	1.35	



CORE SINTERING SYSTEM

MODEL
STM - CST - A70

DESCRIPTION

The design characteristic of the Core sintering system is that it enables the heat treatment of the porous white core preform at 1000°C~1600°C, and also the consolidation to obtain the trans-parent and high-quality preform.

The 2 furnaces (Z1/Z2) are mounted on the front of the frame for dehydration and consolidation respectively, and the high-quality quartz muffle tube is mounted inside the furnace. It is made up of the process gas device that enables the MFC control at the bottom of the muffle, and heat/chemical exhauster at the top of the muffle.

The base material is transferred by the vertical precision bed, and rotated by the top chuck. Its operation applies the PC input/output GUI to facilitate the recipe editing, and it also applies the Siemens motion & drive, ensuring its long-term reliability. It consists of the auto-control system that enables the unmanned operation.

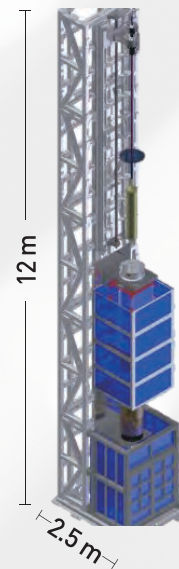


FEATURE

- Low production costs(He, Cl₂ gases)
- High quality preform(OH, Bubble free)
- Heater long life time(fixed type)
- High Temp Control(Accuracy, Stability)

SPECIFICATION

Items	Spec(nominal)	Remarks
Machine Dim	3 m x 3 m x 12.5 m	
Machine(WT)	8 Ton	
Muffle tube(ID)	220 mm	Core(OD) (Ø 85 mm)
Muffle tube(TL)	4,000 mm	Core(SL)(750~800mm)
Core Preform(WT)	9 ~ 10 kg	
Furnace Temp	1200 °C ~ 1600 °C	
Gases	He, Cl ₂ , N ₂	
Power(Total)	130 Kw	*UPS
Clean Class	# 10,000	
Capa(fkm/Machine)	3,300	
Capa(Mfkm/year)	2.89	2.61



CORE SOAKING SYSTEM

MODEL
STM - CSK - A70

DESCRIPTION

The major feature of Core Soaking System lies in removal of internal stress of core preform to increase core characteristics, which consists of Furnace Quartz Muffle Tube, Up-Down Moving System of Preform, Frame, Preform Hanging Part, and Gas Supply System. With adoption of Kanthal Heater, it uses heat generation design for maintaining around 1100 C degree to reliance and long durability.

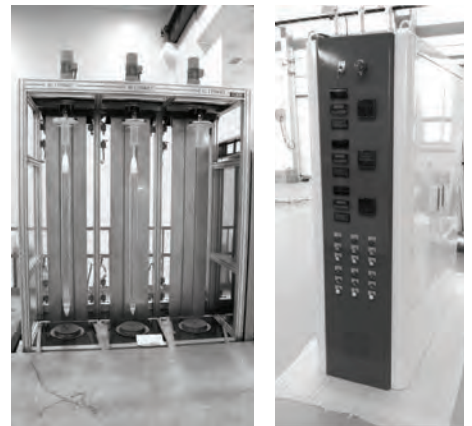
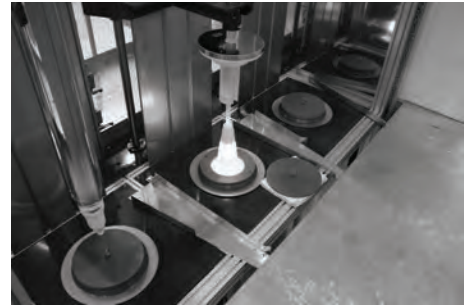
Furnace System adopts stable Kanthal A1 Heater and consists of 3 Muffle Tubes and a Furnace.

Thermocouple applies RR type to assure reliability of temp sensing.

Core preform is fixed by moving cart at quartz holder and its conveyance is performed with precise and steady speed by a motor to prevent shaking of preform. Length of the Muffle is over 2.4 m big enough to soak core preform of over 1.5 m.

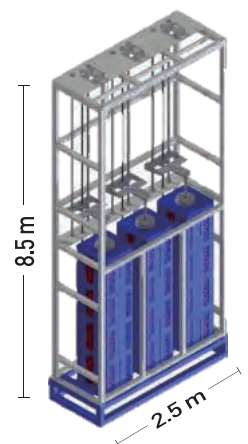
FEATURE

- High quality preform(stress free)
- Not used Gases
- Heater long life time(fixed type)
- High Temp Control(Accuracy, Stability)



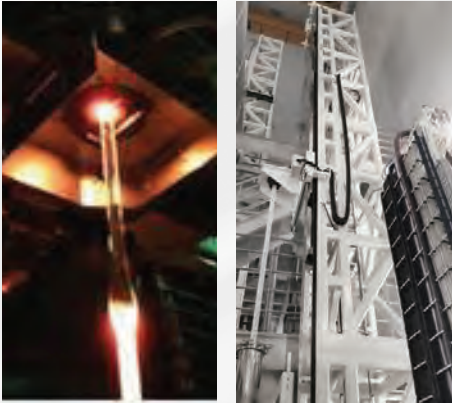
SPECIFICATION

Items	Spec(nominal)	Remarks
Machine Dim	4 m x 2 m x 8.5 m	
Machine WT	2 Ton	
Muffle Tube(ID)	Ø 174 mm	Core(D) (Ø 85 mm)
Muffle Tube(TL)	2,200 mm	Core(L)(750~800mm)
Core Preform(WT)	10 kg	
Furnace Temp	Max 1200 °C	
Power[Total]	100 Kw	
Clean Class	# 10,000	
Capa(fkm/Machine)	6,600	
Capa(Mfkm/year)	3,61	2.61 (330 day)



CORE ELONGATION SYSTEM

MODEL
STM - CEG - A70



DESCRIPTION

- Furnace Body is water-cooled construction made of Stainless steel(316 L)
- Top chamber & shutter should be applied on furnace.
- Heater: High purity graphite resistance (ash contents : less than 10 ppm)
- Furnace inner temp: 2400 °C
- N₂ gas for inside furnace is flow-controlled.
- Water & Gas inlet pressure: max 6 Bar
- Water flowrate: 150 lpm or more
- Dia measuring
 - Laser scanning type
 - Dia measuring range: Ø 3 ~ Ø 100 mm
 - Measuring Repeatability: within 70 µm

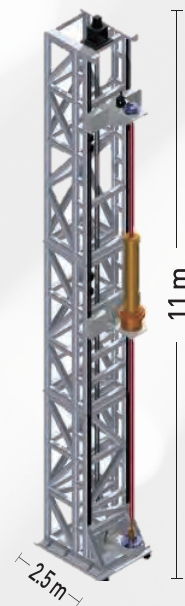


FEATURE

- Chuck(top,bottom) Alignment Accuracy : ±0.05 mm
- High Temp Control(Accuracy, Stability) Range: 1,100 ~ 2,400 °C ±1°C
- Ovality : Max ≤ 0.5 mm
- Bow : Max ≤ 0.5 mm / m
- Tension measurement : 2 Kn

SPECIFICATION

Items	Spec(nominal)	Remarks
Machine Dim	5 m x 5 m x 11 m	
Machine WT	8 Ton	
G. Furnace(ID)	Ø 110 mm	Core(OD) (Ø 85mm)
After E. Core(OD)	Ø 35 ~ Ø 38 mm	Ø 25~Ø 50
After E. Core(L)	1,610 mm X 2 pc	(TL) 4,560 mm
Furnace Temp	2,200 °C ± 1 °C	
Gas	N ₂	
Cooling Water	150 lpm	
Power(Total)	85 Kw	
Clean Class	# 10,000	
Capa(fkm/Machine)	3,300	
Capa(Mfkm/year)	5.25	4.75 (330 day)



CLAD DEPOSITION (OVD) SYSTEM

MODEL
STM - LDO - A70



DESCRIPTION

Clad Deposition System, with its technology of high quality and productivity, adopts horizontal OVD (Outside Vapor Deposition) method to realize the lowest cost for optical fiber preform of the same grade.

Eventually, it can simultaneously produce 3 preforms per equip with the chamber built by materials for anti-heat and anti-corrosion enabling extended running time of substitution parts and with systems designed for air cooling and process flow in consideration of the characteristics of high capacity of burner.

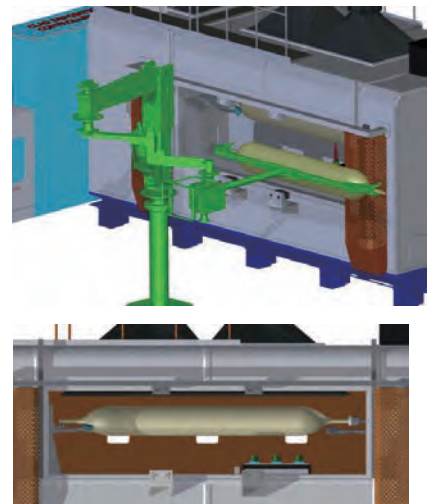
Chemical and gas flows can be freely controlled by computer for automatic recipe and cumulative data are recorded in computer to enable analyze and update at any time. Gas cabinet adopts high purity piping (SUS316EP) to allow no factor of contamination and leaking check of helium gas is done at over 10⁻⁹. Recipe is a highly advanced equipment epochally improved in consideration of accumulated problems in each step of process carefully observed by equip operators.

FEATURE

- Low production Cost(CH₄, DR)
- Auto Weight Control(stability_3Spindle)
- Flash Evaporator(repeatability, responsibility)
- CH₄ High Deposition Rate Burner(Low Cost)
- High Purity Material Control

SPECIFICATION

Items	Spec(nominal)	Remarks
Machine Dim	6 m x 3 m x 4 m	
Machine WT	7 Ton	
Soot Preform (OD)	300 ~ 330 mm	Max Ø 400mm
Soot Preform (TL)	2650 mm	Max 2800mm
Soot Preform (WT)	55 ±2 kg	65±5kg
Number of Spindle	3	Per Machine
Number of Burner	3	Per Spindle
Deposition Rate	90 ±10 g / min	Per Machine
Gases & Chemical	SiCl ₄ , CH ₄ , O ₂ , N ₂ , Air	
Power(Total)	95Kw	
Clean Class	#10,000	#10,000
Capa(fkm/Machine)	4,950	
Capa(Mfkm/year)	1.2	1.31(330 day)



CLAD SINTERING SYSTEM

MODEL
STM - LST - A70



DESCRIPTION

The design characteristic of the Clad sintering system is that it enables the heat treatment of the porous white clad preform at 1000 °C ~1600 °C, and also the consolidation to obtain the trans-parent and high-quality preform.

The 2 furnaces (Z1/Z2) are mounted on the front of the frame for dehydration and consolidation respectively, and the high-quality quartz muffle tube is mounted inside the furnace. It is made up of the process gas device that enables the MFC control at the bottom of the muffle, and heat/chemical exhauster at the top of the muffle.

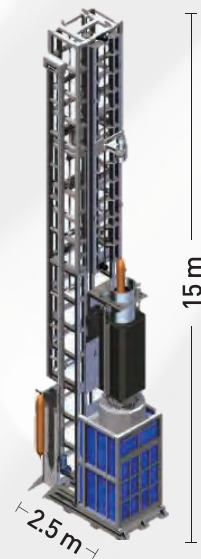
The base material is transferred by the vertical precision bed, and rotated by the top chuck. Its operation applies the PC input/output GUI to facilitate the recipe editing, and it also applies the Siemens motion & drive, ensuring its long-term reliability. It consists of the auto-control system that enables the unmanned operation

FEATURE

- Low production costs(He, Cl₂ gases)
- High quality preform(OH, Bubble free)
- Heater long life time(fixed type)
- High Temp Control(Accuracy, Stability)

SPECIFICATION

Items	Spec(nominal)	Remarks
Machine Dim	3 m x 3 m x 15 m	
Machine(WT)	8 Ton	
Clad Preform (OD) Sintered	Ø130mm (L: 2450mm)	Max Ø145mm
Clad Preform (WT)	55 ±2 kg	65 ±5 kg
Muffle Tube (ID)	Ø360mm	Max Ø450mm
Furnace Temp	1200 °C~1500 °C	Max 1600 °C
Gases	He, Cl ₂ , N ₂	
Power(Total)	160 Kw	*UPS (130)
Clean Class	# 10,000	
Capa(fkm/Machine)	(1650)	
Capa(Mfkm/year)	1.2	1.89 (330 day)



CLAD SOAKING SYSTEM

MODEL
STM - LSK - A70



DESCRIPTION

Clad Soaking System is an equipment with its characteristics of removing internal stress of Clad preform to promote the advantage of Clad, which is composed of Furnace Quartz Muffle Tube, Up-Down Moving System of Preform, Frame, Preform Hanging Part, Gas Supply System. With adoption of excellent Kanthal Heater, it applies a design of heat generation technology for maintaining around 1100C degree for long run and durability.

Furnace System adopts stable Kanthal A1 Heater and consists of 3 Muffle Tubes and a Furnace.

Thermocouple applies RR type to assure reliability of temp sensing.

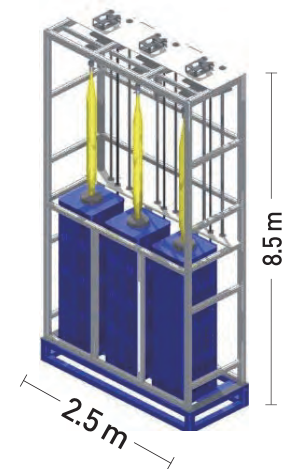
Clad preform is fixed by moving cart at quartz holder and its conveyance is performed with precise and steady speed by a motor to prevent shaking of preform. Length of the Muffle is over 3.0 m big enough to soak Clad preform of over 2.5 m.

FEATURE

- High quality preform(stress free)
- Not used Gases
- Heater long life time(fixed type)
- High Temp Control(Accuracy, Stability)

SPECIFICATION

Items	Spec(nominal)	Remarks
Machine Dim	4 m x 2 m x 8.5 m	
Machine WT	2 Ton	
Muffle Tube(ID)	210mm (L: 2450mm)	Max 250mm
Muffle Tube(TL)	3,000 mm	Max 3,500mm
Clad Preform(WT)	55 ±2 kg	65 ±5 kg
Furnace Temp	1000 °C~1100 °C	Max1200 °C
Power[Total]	90 Kw	
Clean Class	# 10,000	
Capa(fkm/Machine)	4,950	
Capa[Mfkm/year)	2.71	2.45 (330 day)



PREFORM SHARPING SYSTEM

MODEL
STM - PSH - A70



DESCRIPTION

The technology is adopted for a Sharpening System in order to save operation time before extrusion of optical fiber. The sinter-treated bottom tip of Preform will be sharpened by free fall in blob melted in the Furnace of 2200C degree high temp.

A lift system is equipped at the profile of main frame to vertically transport Preform. The System consists of Transformer to supply the furnace with power, cooling water supply mechanism and air gas supply device to prevent the heater from possible damage in furnace.

- Dimension : Body ID Ø 460 * 520
- Furnace temp : 2,150 °C
- Gases : Ar , N2(max 6 bar)
- Cooling Water : PCW(max 7 Bar)

FEATURE

- High Temp Control(Stability, ±0.1 °C)
- Repeatability
- Gas control(MFC Accuracy , 1% FS)
- PC, PLC Auto control

SPECIFICATION

Items	Spec(nominal)	Remarks
Machine Dim	4 m x 4 m x 11 m	
Machine WT	7 Ton	
Working size	Ø 130 ~ Ø 150 mm	Length: ≤ 2500 ~ 3000 mm
Furnace Temp	≤2200 °C	
Preform(WT)	55 ±5 kg	
Cooling Water	100 lpm	
Gases	Ar, N ₂	
Power(Total)	80 Kw	
Clean Class	# 10,000	
Capa(Mfkm/year)	5.0	



PREFORM MEASURING SYSTEM

MODEL STM - CPM - A70



SPECIFICATION

Items	Spec(nominal)
Machine Dim	3.5 m x 2 m x 1.3 m
Machine WT	0.3 Ton
Core diameter	$\leq \varnothing 50$ mm
Core bow, ovality	≤ 0.1 mm
Capa(Mfkm/year)	6.0

MODEL STM - LSM - A70



SPECIFICATION

Items	Spec(nominal)
Machine Dim	4.5 m x 2 m x 2.5 m
Machine WT	0.3 Ton
Density(g / cm3)	0.1 - 0.9 \pm 0.01 g
Weight(kg)	Max 100 \pm 0.01 Kg
Capa (Mfkm / year)	6.0

SiCl₄ VAPORIZING SYSTEM

FURNACE HEATING CONTROL SYSTEM



| FEATURE

Items	Spec(nominal)
Machine Dim	1.3m x 0.6m x 2.0m
Machine WT	0.5Ton
Chemical	SiCl ₄ , GeCl ₄
Flowrate(Max)	5~200g/min
P. Accuracy	≤±3torr

| FEATURE

Items	Spec(nominal)
Machine Dim	1.5m x 0.6m x 2.1m
Machine WT	0.5Ton
Temp Control	800°C~1,600°C
T.Accuracy	≤±1°C
Heater	Kanthal super

GAS SUPPLY SYSTEM

CH₄ CABINET

MODEL STM - LDF - A70



| FEATURE

- Easy of operation & maintenance
- Precision MFC Control
- Gases : CH₄, O₂, N₂, Air
- Customized design for specific applications
- Maximizes the safety of an operator

PURIFIER (N₂, He)

MODEL STM - LDFN - A70



| FEATURE

- Easy of operation & maintenance
- Ultra high purity : over 8N
- Purification : N₂, He, O₂, Cl₂
- Customized design for specific applications
- Maximizes the safety of an operator

ACCESSORIES

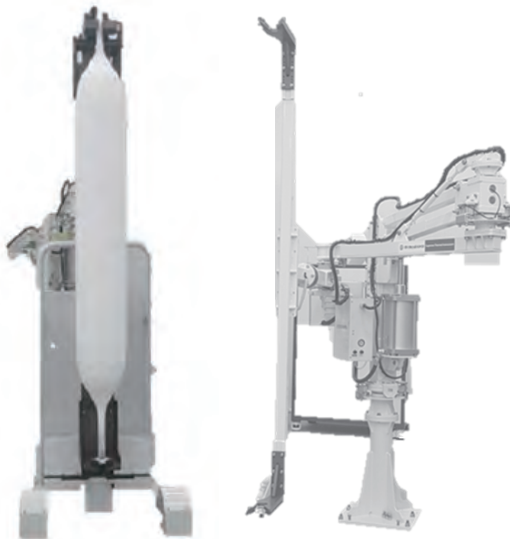
WELDING M/C



CUTTING M/C



PREFORM MOVING SYSTEM



STI Co.,Ltd.

Head Office / 39, Secheon-ro 7-gil, Dasa-eup, Dalseong-gun, Daegu, Korea

F a c t o r y / Tel. +82 53-716-1851 Fax. +82 53-716-1854

Company E-mail. sti@sti.kr **Business E-mail.** stiopm@sti.kr

www.stiopm.com