



SHIJIAZHUANG SAGA MACHINERY CO., LTD

Address: No. 7 Guihua Road, West Workshop B, Economic and Technology Development District, Shijiazhuang city, Hebei, China

Website: www.sagahf.com Mobile Phone: 0086-15632196963 Email: sagahf@163.com sagahf1@126.com



HIGH FREQUENCY VACUUM WOOD DRYER ____HFVD Series

High frequency vacuum wood dryer is small capacity but rapid with low temperature drying machine, suitable for drying all kinds of wood, from veneer/lamella/wood board to thick lumber, second time balance humidity, even large dimension heavy timber for wooden house.

- For thin pieces, like veneer or floor lamella, HF vacuum drying technology not only offers short cycle solution, but also eliminates curved or shrink problem.
- For thick and hard wood, HF vacuum dryer brings good quality with uniform humidity, free of split or spark both on surface and core, short drying cycle will help a lot to meet demand or production.



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PRINCIPLE OF HF VACUUM WOOD DRYING

High frequency vacuum drying technology constitutes a combination of two special methods: heating by high frequency current and drying in vacuum where the boiling point of water is decreased with decreasing pressure.

1. High frequency heating:

High frequency power acts on the moisture in wood, it penetrates the wood, where there is water or moisture, there is high frequency power, so it can dry rapidly and uniformly.

2. Vacuum condition

In vacuum condition, the water is vaporized at very low temperature, it eliminates sparking or splitting problem for hard wood, especially extremely hardwood likely to spark if drying temperature is high.

Furthermore, vacuum condition creates a minus pressure in the dryer, the movement of water molecule through wood increases leading to shorter drying time than can be achieved at atmospheric pressure, minus pressure sucks water or moisture out of wood quickly.

CHARACTER OF SAGA HIGH FREQUENCY VACUUM WOOD DRYER

1. SAGA offers **ONE BUTTON CONTROL technology**

Full automatic drying program within PLC control system for different wood, the operator does not need to have much knowledge about wood drying to cook the wood perfect.

2. Precise and reliable monitoring system

High precise and stable monitoring spare parts will always guide on machine both for warranty of good drying quality or safety of personal and machine.

3. Well selected spare parts

High grade stable spare parts are chosen which is tested for long time for machine and make sure stable running and problem free.

4. Logical and safe design

With more than 20 years of experienced engineer, customers can expect a more logical and humanistic machine that is easy to use, run stably and help a lot in production.



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PARAMETER							
		HFVD30-SA	HFVD45-SA	HFVD60-SA	HFVD80-SA	HFVD100-SA	HFVD120-SA
Overall Size (mm)	HF Generator	1000*1050*1950	1000*1050*1950	1250*1200*2050	1250*1200*2050	1250*1200*2050	1250*1200*2050
	Tank	4200*2150*2100	5700*2150*2100	7300*2150*2100	9300*2150*2100	7300*2250*2200	9000*2250*2200
	Cooling System	1500*1150*2100					
	Control Cabinet	700*400*1700					
Gross Weight(KGS)		6400	7300	8000	9200	10000	11000
Inside Diameter(mm)		Φ1700	Φ1700	Φ1700	Φ1700	Φ1900	Φ1900
Stack Timber Size(mm)		1000*1000*3000	1000*1000*4500	1000*1000*6000	1000*1000*8000	1300*1300*6000	1300*1300*8000
Stack Timber Capacity		3m3	4.5m3	6m3	8m3	10m3	13m3
HF Input Power		40KVA	40KVA	70KVA	70KVA	70KVA	70KVA
HF Output Power		30KW	30KW	50KW	50KW	50KW	50KW
HF Oscillation		6.78Mhz					
Protection		Overload protection/Wind cooling pressure detection/Filament 2 stage starts/Lose phase protection					
Tuning Mode		Variable vacuum capacitor					
Cooling Type		Force wind cooling					
Main Spare Parts		Schneider/Siemens/Omron/Delta					
Hydraulic System		Taiwan brand					
Temperature		45-70 C					
Temperature System		Fiber optic glass temperature sensor					



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Moisture Sensor	Weighing system(PATENT)					
Dewatering	Full automatic					
Cooling in Tank	Condensation system					
Stacking Way	Manual					
Feeding Way	Automatic					
Thickness of Tank	12mm					
Hydraulic Pressure	3 ton	3 ton	6 ton	6 ton	6 ton	6 ton
Vacuum Pump	7.5Kw	7.5Kw	7.5Kw	11Kw	11Kw	11Kw
Vacuum Range	-0.07~-0.093Mpa					
Cooling Type	Stainless steel water-ring vacuum pump					
Controller	PLC program					
Environment Temp.	1~45 °C					

For the operation of installation requires a Three phase electric power(industrial applications only)

- United Kindom (UK) 415 V, 50 Hz
- United States (USA) 240/480 V, 60 Hz
- Canada 480/600 V, 60 Hz
- Australia/ France/ Germany/ Israel/ Italy 400 V, 50 Hz
- Brazil/ Chile/ Paraguay/ Russia 380 V, 50 Hz
- Japan 200 V, 60 Hz
- Korea 380 V, 60 Hz
- Mexico 480 V, 60 Hz
- Peru 220 V, 60 Hz
- Saudi Arabia 400 V, 60 Hz



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WORKING PROCESS

1. Load timber on infeed cart and place electrode after layer finished.
2. Push into the dryer and close the door.
3. Start the system, vacuum pump starts first, when it reaches set limit, high frequency power starts automatically heating.
4. When high frequency power heats to set maximum limit temperature, HF power stops and waits, after temperature falls down to minimum limit, HF starts and heats again, during the cycle, vacuum pressure is always near to -0.09Mpa, if it's lower than set limit, vacuum pump starts working automatically.
5. When the drying cycle finishes, the weighing sensor will calculate and stop all system, drying process finishes.

DRYING CHART FOR COMMON WOOD

Wood Species	Start Moisture	End Humidity	Drying Timer(hour)
Extremely Hardwood			
Mahogany valued wood Density>1.0	15%	10%	80
	30%	10%	150
Medium Hardwood			
Beech/Oak/Ash,etc Density ≤ 0.6	20%	8%	70
	40%	8%	120
Softwood			
Pine Density<0.5	15%	8%	20
	40%	8%	75
Above is just common comparing chart for reference, but there are so many wood species world wide, you can compare with the density of your wood type and get an approximately calculation, for some special wood like teak, contains oil or other wood, may need much different drying time. Thickness changes also affects drying time, so this information much rely on real condition.			



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ADVANTAGE OF HF VACUUM WOOD DRYER

1. **Short drying time** : according to different timber, drying speed is 1~5 times than conventional wood kiln.
2. **Good drying result** : uniform humidity, stress elimination, no cracking/ bending/ shrink/ deformation problem, more stable and less waste.
3. **Easy operation** : using Saga smart control system, no need much knowledge of wood and drying experience. Only set all data into PLC touch screen, one button starts, and stop automatically, no need to adjust and guide in day and night.
4. **Less space**: can be installed in workshop.
5. **Environmental**: the power is electricity, no need boiler or other heating source, no pollution.
6. **Saving labor**: no need operator to guide all the time, no sticks between wood boards, saving labor and time.

REAL TIME HUMIDITY DETECTION, BASED WOOD MOISTURE CALCULATING FORMULA

Principle of moisture detecting is calculating by water evaporation. Set start moisture into PLC touch screen, the program calculates how much water should be dried out, when the moisture gets to goal end humidity, HF vacuum dryer stops automatically.

- Normal metal temperature sensor is effected by high frequency power and only can check moisture in one piece.
- It cannot be reference if only weight the water out of drying machine, it is not precise, because moisture cannot be collected.
- If don't put weighing sensors under the dryer, have to pull out to measure the weight of wood, it cannot detect the present moisture in drying process.

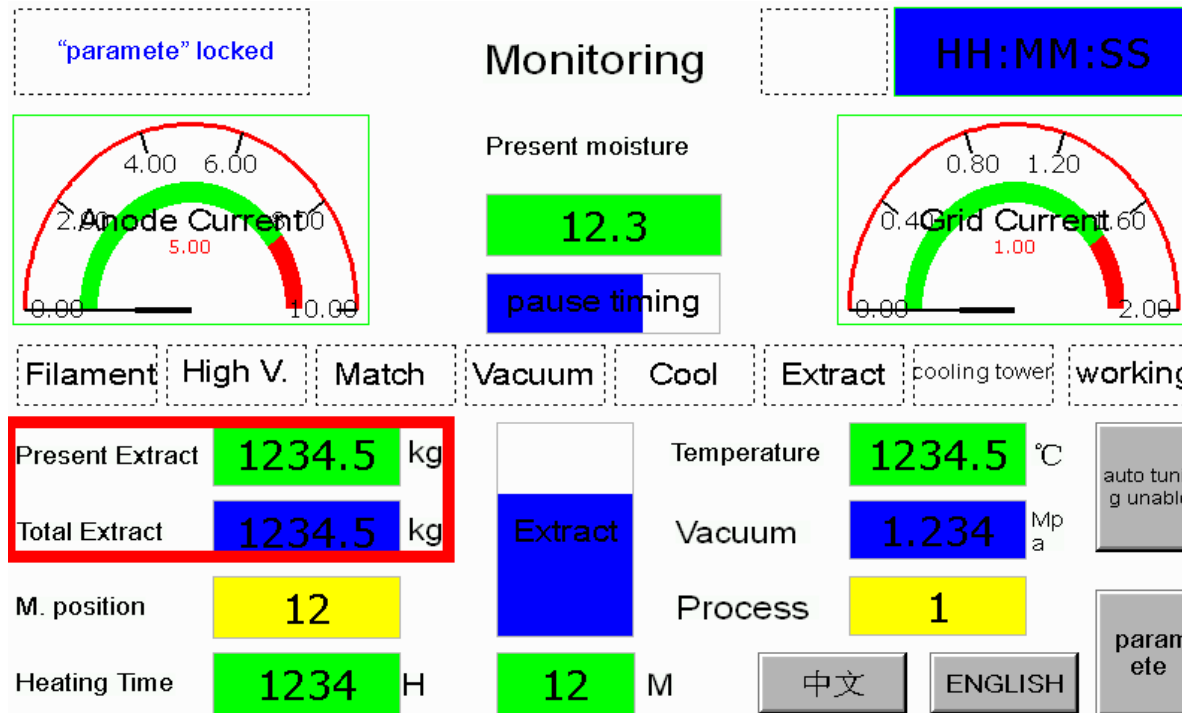
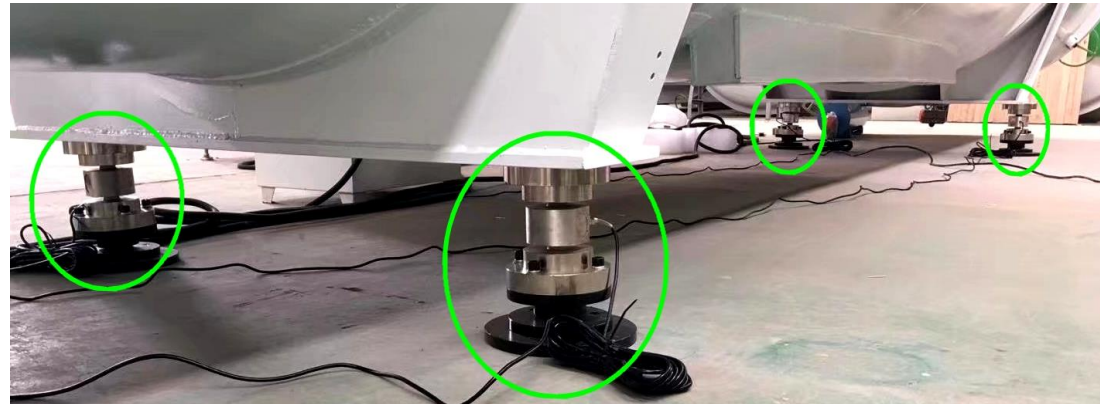
Calculating present moisture by weighing system is our patent, it can check the weight of moisture and water out of wood, Saga full automatic system can calculate the moisture precisely. We use knuckle bearing with weighing sensor to make sure the accurate weight.



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SAGA SMART HIGH FREQUENCY VACUUM DRYING TECHNOLOGY

Saga Machinery Co., Ltd is first one who has designed and developed full automatic HF vacuum drying technology in China, we have nearly 10 years experience and already got an easy operating drying process, it can instead of experienced person, no need to guide. There are 40 different wood drying experience in Saga full-auto drying program.





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Doing research in BIO BIO University in Chile.





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CONTROL PANEL with Program



Process Set

high limit Temperature	####.## °C	low limit Temperature	####.## °C
frist vacuum high limit	#####	second vacuum high limit	#####
frist vacuum low limit	#####	second vacuum low limit	#####
first Timer for Vacuum	##### M	second Timer for Vacuum	##### M
Extract interval	#####.## M	Extract start Timer	#####.## M
Extract Time	#####.## S		

ATTION: low limit must Less than high limit!! All above value is absolute value.

cool set ok

Press F2 to Management Set

Set HH:MM:SS

Start moisture	###.## %	Anode Current	###.## A
Final moisture	###.## %	Grid Current	###.## A
Tare	12345.6 kg	Heating Time	### H ## M
Gross	12345.6 kg	ATTION: Ratio between anode and grid current should 4-6:1!	
Net weight	12345.6 kg		

Please select process

select process auto tuning unable OK cancel

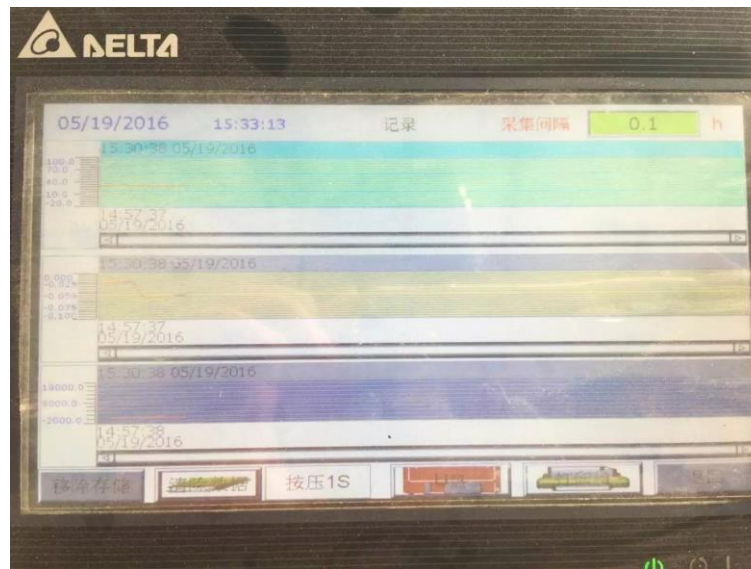


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USB RECORD- **MOISTURE, VACUUM AND WEIGHT**



Record in program

A1	TIME	DATE	Temperature
1	15:13:37	05/19/201	30.8
2	15:14:37	05/19/201	30.8
3	15:15:37	05/19/201	30.9
4	15:20:37	05/19/201	31
5	15:21:38	05/19/201	30.9
6	15:22:37	05/19/201	30.9
7	15:23:37	05/19/201	30.9
8	15:24:37	05/19/201	30.8
9	15:25:37	05/19/201	30.7
10	15:26:38	05/19/201	30.7
11	15:28:37	05/19/201	30.7
12	15:29:37	05/19/201	30.7
13	15:30:38	05/19/201	30.7

Temperature

A1	TIME	DATE	Vacuum
1	15:13:38	05/19/201	-0.019
2	15:14:38	05/19/201	-0.025
3	15:15:38	05/19/201	-0.045
4	15:20:37	05/19/201	-0.053
5	15:21:38	05/19/201	-0.053
6	15:22:38	05/19/201	-0.053
7	15:23:38	05/19/201	-0.053
8	15:24:37	05/19/201	-0.053
9	15:25:38	05/19/201	-0.052
10	15:26:38	05/19/201	-0.052
11	15:28:37	05/19/201	-0.05
12	15:29:37	05/19/201	-0.049
13	15:30:38	05/19/201	-0.049

Vacuum

A1	TIME	DATE	weight
1	15:13:38	05/19/201	1029.6
2	15:14:38	05/19/201	1030
3	15:15:38	05/19/201	1030.9
4	15:20:38	05/19/201	1027.1
5	15:21:38	05/19/201	1026.2
6	15:22:38	05/19/201	1027.5
7	15:23:38	05/19/201	1027.1
8	15:24:38	05/19/201	1026.8
9	15:25:38	05/19/201	1028.1
10	15:26:38	05/19/201	1027.8
11	15:28:38	05/19/201	1028.1
12	15:29:38	05/19/201	1027.8
13	15:30:38	05/19/201	1029.3

Weight

OPTIC TEMPERATURE SENSOR- **more precise, not effect by high frequency power**





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HYDRAULIC PRESS CART –keep wood straight in drying process



RUST PROTECTION- sanding and anti-rust painting

Optional: Composite stainless steel material



MOVA





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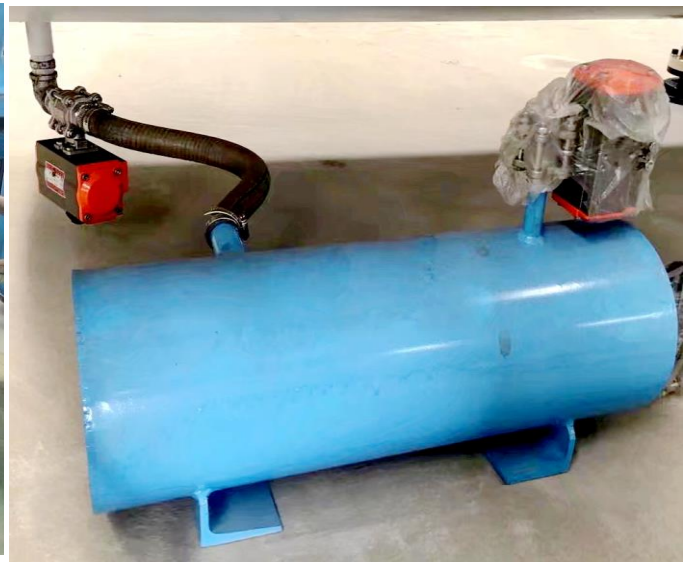
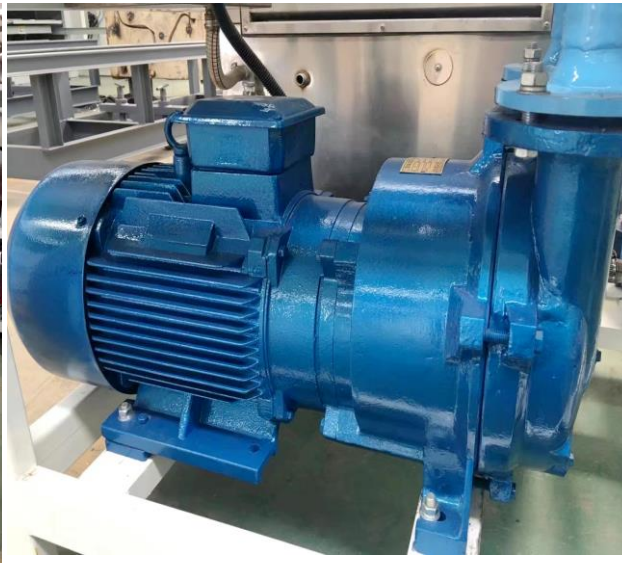
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BLE INFEET AND OUTLET CART-saving space



COOLING SYSTEM-stainless steel power, vacuum pump, water pump





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PACKING & SHIPPING





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Our Shop in Foshan, Lunjiao



CE certificate

 CERTIFICATE ATTESTATION CERTIFICATE OF MACHINERY DIRECTIVE	
Technical file of the company mentioned below has been observed 2006/42/EC Machinery Directive has been taken as references for these processes Company Name: Shijiazhuang Qinchuan Machinery Co., Ltd.	
Company Address	: No.7 Guihua Road, West Workshop B, Economic and Technological Development District, Shijiazhuang City, Hebei, China
Manufacturer Name	: Shijiazhuang SAGA Machinery Co., Ltd.
Manufacturer Address	: No.7 Guihua Road, West Workshop B, Economic and Technological Development District, Shijiazhuang City, Hebei, China
Related Directives and Annex	: Machinery Directive 2006/42/EC / Annex VIII
Related Standards	: EN 12100: 2010; EN 60204-1: 2006+A1: 2009+AC: 2010
Product Name	: High frequency Vacuum Wood Dryer
Report No and Date	: SAGA-180305
Product Brand/Model/Type	: HFVD30-SA, HFVD45-SA, HFVD60-SA, HFVD80-SA, HFVD100-SA, HFVD120-SA, HFVD150-SA
Certificate Number	: M.2018.201.N3677
Initial Assessment Date	: 05.03.2018
Registration Date	: 06.03.2018
Release Date/No	: *
Expiry Date	: 05.03.2023
The validity of the certificate can be checked through www.udem.com.tr . The CE mark shown on the right can only be used under the responsibility of the manufacturer with the completion of EC Declaration of Conformity for all the relevant Directives. The certificate remains the property of UDEM International Certification Auditing Training Centre Industry and Trade Inc. Co. to whom it must be returned upon request. The above named firm must keep a copy of this certificate for 15 years from the registration of certificate. This certificate only covers the product(s) listed above and UDEM must be notified in case of any changes on the product(s). Address: Mutlukent Mahallesi 2073 Sokak (Eski 93 Sokak) No:10 Cankaya - Ankara - TURKEY Phone: +90 0312 445 03 90 Fax: +90 0312 443 03 70 E-mail: info@udem.com.tr www.udem.com.tr	
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SAGA: A team with passion





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OUR FACTORY

