COMPRESSED AIR RESIN DRYER (CARD)

FarragTech offers 4 series of **C**ompressed **A**ir **R**esin **D**ryer (***CARD***) to dry hygroscopic plastic resins.

Many standard accessories and complete systems are available:

- Installation flanges, shut-off slides, magnet boxes, floor stands, suction boxes and remote control boxes
- Material handling equipment including venturi loaders, single self-contained vacuum loaders, proportional loaders, dust separators and central vacuum loading systems (see *Material Handling*)
- Compressed air units including oil separators and refrigeration dryers
- Heatless regenerated compressed air dryers for dew point < - 70 ºC
- Heat recovery from the air compressor to heat the resin in the dryer

All standard 4 dryer series feature:

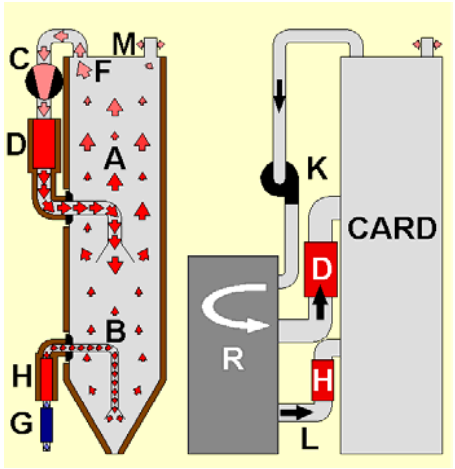
- Life time guarantee for performance and drying results
- 3 year full warranty including parts and labor
- Lowest operation cost with compressed air cost included
- Very simple operation
- virtually no maintenance requirements
- Mirror stainless steel drying hoppers
- Insulated hoppers for operating temperature up to 200 ºC
- Stainless steel housing with temperature resistant sight glasses
- Removable air distributors with external disconnecting access
- Switch cabinet and wiring according to CE standards

The sophisticated and most economical *CARD L-Series* is available in 10 standard sizes to cover material flow rates up to 1100 kg/h with hopper volumes from 250 l to 3500 l.

It preheats the resin in the upper part of the hopper {A} by the closed secondary air circuit before it dries it in the lower part {B} by the open process air circuit.

The secondary air is sucked at the top of the hopper {F} by the blower {C} and heated in the electric heater {D} before it is returned to the hopper.

Pre-dried compressed air is supplied to the process air control valve group, which decompresses the air and controls the air flow rate before it is heated in the electric heater {H} and distributed at the bottom of the hopper.



The dry process air rises upwards removing the moisture from the resin before it is exhausted through the dust filter {M} on top of the hopper.

Standard compressed air at a pressure of 7 bar and a pressure dew point of 5 ºC reaches a dew point of -21 ºC as soon as the air is decompressed to atmospheric air pressure at sea level, which is very suitable for drying hygroscopic resins (See *Resin Drying Background*).

The integrated micro processor controller measures the difference between the temperature at the bottom and the top of the hopper and regulates the air flow rates to match the material throughput thus saving energy and insuring perfect drying results. In The controller automatically turns the sleep mode on if dry material is not required in the plant after elapsing the sent drying time. The drying temperature is dropped down, the process air flow is reduced to minimum and the secondary air circuit is switched off.

The *CARD L-Series* makes use of heat recovered from the air compressor {R} to reduce or eliminate the electrical heating demand from the heaters {D} and {H}.

FarragTech offers optional heat recovery systems with single and central dryers to preheat the secondary air stream {K} and the process air stream {L}. Depending on the compressor type and the air pressure range preheating to temperatures between 80 ºC and 180 ºC can be reached in heat recovery systems.

The *CARD L-Series* is designed with a lot of attention paid to all details after many years of experience in manufacturing compressed air resin dryers. The slim and tall design insures perfect material and air flow through the hopper. The resin close to the walls of the hopper is perfectly heated to the desired drying temperature as well as the resin at the center of the hopper due to the efficient high temperature insulation around the entire hopper and the well designed air distributors.

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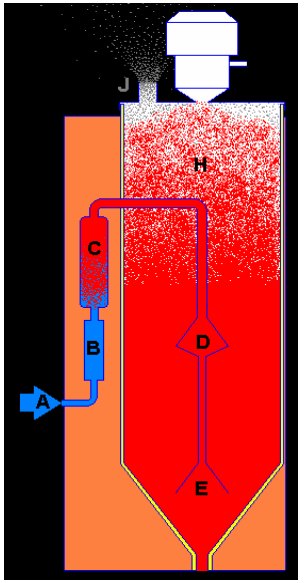
CARD L-Series system description and features:

- The *CARD L-Series* is designed for floor standing applications beside the processing machine with smallest footprint including floor stand and suction box or in a mezzanine and gravity feed above the machine
- The hoppers are designed for possible side-by-side installation in different sizes to form very compact central drying systems in plant rooms
- Every hopper is an independent dryer with integrated switch cabinet, control unit, process and secondary air circuits
- Dryers can be added, displaced or removed from a central system at any time. The remote compressed air unit transforms the individual dryers to central drying system
- All hoppers are equipped with appliances and control outputs to adapt and operate 2 self-contained vacuum loaders or venturi loaders for loading and unloading the hopper
- Every hopper includes 2 service doors for easy cleaning access and 2 sight glasses

The standard *CARD L-Series* are controlled by the easy to use (*FIT*) Farrag Intelligent Terminal featuring:

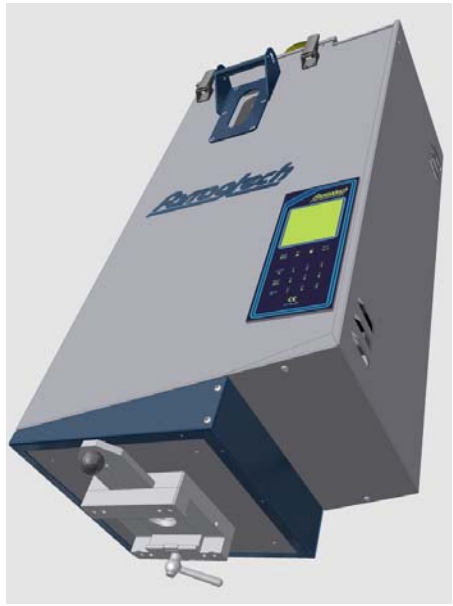
- Full graphical display
- Pre-programmed drying data menu for all common resins
- Free-programmable menu for special resins or alloys
- Standard continuous operation mode with temperature input
- Continuous and batch drying modes
- Automatic modulating energy control based on actual material throughput
- Controls for loading and unloading units included
- Automatic sleep mode at low temperature to avoid material degradation and overdrying with input from the processing machine or integrated loaders
- Electrical power and compressed air consumption display and data bank for energy consumption with analyses
- Free-programmable timer by date or repeated weekly function for automatic loading and drying start
- Fault analyses and alarm output for the included strobe light and the acoustical buzzer
- Software available in several languages
- Data input/output interface
- Optional interface and software for remote control through the processing machine controller available for several machine types
- Optional dew point display and alarm
- CE compliant

The simple and economical *CARD S-Series* is available in 6 standard sizes to cover material flow rates up to 50 kg/h with hopper volumes from 10 l to 160 l. The standard *CARD S-Series* is equipped with *FIT* and it has the same advantages of the larger *L-Series*.



This small dryer series uses compressed air for heating and drying in one open circuit and they are still more economical to operate when compared with desiccant dryers.

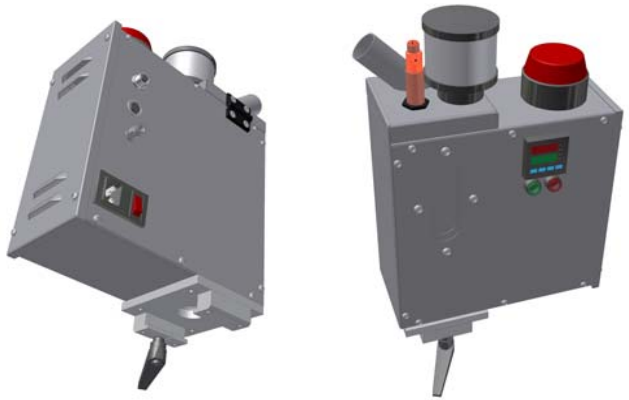
A small amount of pre-dried compressed air {A} is branched from the central compressed air system in the moulding plant and supplied to the dryer. The air is decompressed and regulated through a group of valves {B}, heated in electric heater {C} and released inside the drying hopper {H} through the air distributor. The air distributor releases the heated air through outlets {D} and {E} in different levels inside the drying hopper insuring that the residence time of the resin at maximum temperature is sufficient to heat the pellets all the way through to the center. The process air is then exhausted through the filter {J} on top of the hopper.



The compressed air flow rate is variable based on the resin flow rate and the hopper is of a slim and tall design to avoid funnel flow.
The *CARD S-Series* does not lose drying efficiency over time and the drying results are guaranteed for life as long as a standard pre-dried compressed air is provided.
With no moving parts, no wear and tear, the units are virtually maintenance free.
The *CARD S-Series* is designed with a lot of attention paid to details. The compact size and the small footprint design allows for two different installation types; direct installation on machine extruders with gravity feed or floor standing installations on mobile frames with suction boxes to unload the dried resin.
All hoppers are also equipped with appliances and control outputs to adapt 2 self-contained vacuum loader or venturi loaders. Because of limited space on top, only compact venturi loaders can be applied for loading material to the smallest dryer of this series (*CARD 10 S)*.
The smaller sizes (10 l, 20 l and 40 l) are equipped with a hinged lid for easy cleaning access from the top and 2 sight glasses on either hopper side. The larger sizes (70 l, 110 l and 160 l) are equipped with one service door on the side of the hopper, a hinged lid and 3 sight glasses.
All hoppers are equipped with a handle on each hopper side to allow for a safe grip when moving dryers on the floor or sliding dryers on extruder flanges.
Lockable robust, casters are installed under the mobile frames to insure operation safety in floor standing installations. Crane lifting holes are available on both dryer sides. For safety reasons it is not recommended to move or lift the dryers with material in their hoppers.

The low cost *CARD E-Series* is also available in 6 standard sizes to cover material flow rates up to 50 kg/h with hopper volumes from 10 l to 160 l. The same hoppers and most components of the *S-Series* are used in the *E-Series* with basic controls.
The *CARD E-Series* is designed to be comparable with the standard operation functions offered in small size desiccant dryers.
A simple temperature controller is used in this series to control the process air flow as set by the operator. The air flow rate is factory set to the value required for maximum material flow rate in each size.
The energy cost (including compressed air cost) is lower than the energy cost when operating comparable desiccant drier sizes but the maintenance-free operation and the long life time of the *CARD E-Series* makes it more economical and desirable.
The hopper lids of the low cost series are designed to adapt loaders with integrated or external controls. No appliances to operate or control material loaders are included in this dryer series. Because of limited space on top, only compact venturi loaders can be applied for loading material to the smallest dryer of this series (*CARD 10 E)*. *CARD E-Series* is also applicable in both installation types; on the extruder or floor standing (see *CARD S-Series*).

The *CARD G-Series* is the smallest resin dryer series on earth. It is designed for direct installation on extruders of micro injection moulding machines. The *G-Series* is available in 3 sizes with hopper volumes of 1.5, 3 and 6 l.
This series is designed with venturi loaders integrated in hopper lids and loader controls integrated in the switch boxes. With basic temperature control the *CARD G-Series* is very similar to the *E-Series*.
Hinged lids and one temperature resistant sight glass are standard in the G-Series.
A simple and compact sliding flange is one of the very few accessories available for the series.



MATERIAL THROUGHPUTS AND TECHNICAL DATA

Material throughputs are based on material supplier's recommendation and bulk density of 0.65 hg/l (0.8 kg/l for PET)

	Moisture(%)		Temp.	Time	G-Series			E-Series / S-Series						L-Series									
	Initial	Resid.	(°C)	(h)	1	3	6	10	20	40	70	110	160	250	450	600	850	1200	1650	2000	2500	3000	3500
ABS	0.45	0.05	80	2	0.5	1.0	1.9	3.2	6.4	13	22	35	51	80	145	195	275	385	530	640	800	960	1120
CA	0.7	0.1	80	2	0.5	1.0	1.9	3.2	6.4	13	22	35	51	80	145	195	275	385	530	640	800	960	1120
CAB	0.7	0.1	75	2	0.5	1.0	1.9	3.2	6.4	13	22	35	51	80	145	195	275	385	530	640	800	960	1120
CP	1.0	0.1	75	2	0.3	0.6	1.2	2.0	4.0	8	14	22	32	50	90	120	170	240	330	400	500	600	700
PA 6	0.5	0.02	75	4	0.2	0.5	1.0	1.6	3.2	6	11	18	26	40	75	100	140	195	265	320	400	480	560
PA 6.6	0.5	0.2	80	4	0.2	0.5	1.0	1.6	3.2	6	11	18	26	40	75	100	140	195	265	320	400	480	560
PA 12	0.7	0.02	80-120	4	0.2	0.5	1.0	1.6	3.2	6	11	18	26	40	75	100	140	195	265	320	400	480	560
PBTP	0.25	0.015	140	2.5	0.4	0.8	1.6	2.6	5.2	10	18	29	42	65	120	160	225	312	430	520	650	780	910
PC	0.16	0.01	120	2	0.5	1.0	1.9	3.2	6.4	13	22	35	51	80	145	195	275	385	530	640	800	960	1120
PE	0.2	0.05	85	1.5	0.3	0.6	1.2	2.0	4.0	8	14	22	32	50	90	120	170	240	330	400	500	600	700
PES	0.43	0.02	150	2.5	0.4	0.8	1.6	2.6	5.2	10	18	29	42	65	120	160	225	312	430	520	650	780	910
PET	0.25	0.003	180	4	0.3	0.6	1.2	2.0	4.0	8	14	22	32	50	90	120	170	240	330	400	500	600	700
PET G	0.6	0.015	75	6	0.2	0.3	0.7	1.1	2.2	4	8	12	18	28	50	66	94	132	185	225	280	335	390
PI	0.32	0.05	120	2.5	0.4	0.7	1.4	2.4	4.8	10	17	26	38	60	110	144	204	290	400	480	600	720	840
PMMA	0.4	0.02	80	2.5	0.4	0.7	1.4	2.4	4.8	10	17	26	38	60	110	144	204	290	400	480	600	720	840
POM	0.25	0.05	100	2.5	0.4	0.7	1.4	2.4	4.8	10	17	26	38	60	110	144	204	290	400	480	600	720	840
PP	0.2	0.05	90	1.5	0.3	0.6	1.2	2.0	4.0	8	14	22	32	50	90	120	170	240	330	400	500	600	700
PPS	0.2	0.005	150	2	0.4	0.8	1.7	2.8	5.6	11	20	31	45	70	130	170	240	340	465	560	700	840	980
PS	0.1	0.02	80	1.5	0.5	0.9	1.8	3.0	6.0	12	21	33	48	75	135	180	255	360	495	600	750	900	1050
PSU	0.1	0.02	120	1.5	0.5	0.9	1.8	3.0	6.0	12	21	33	48	75	135	180	255	360	495	600	750	900	1050
PUR	0.9	0.01	90	2.5	0.4	0.8	1.6	2.6	5.2	10	18	29	42	65	120	160	225	312	430	520	650	780	910
SAN	0.3	0.05	80	2	0.5	0.9	1.8	3.0	6.0	12	21	33	48	75	135	180	255	360	495	600	750	900	1050
SB	0.6	0.02	80	1.5	0.5	0.9	1.8	3.0	6.0	12	21	33	48	75	135	180	255	360	495	600	750	900	1050

CARD TECHNICAL DATA	1	3	6	10	20	40	70	110	160	250	450	600	850	1200	1650	2000	2500	3000	3500
Max. Compressed air consumption (Nm³/h)	0.5	1	2	3.2	6.5	13	23.5	37.5	53.5	19	32	42	60	83	115	140	175	210	245
Min. Compressed air consumption (Nm³/h)	0.5	1	2	1*	2*	4*	5*	6*	7*	5	8	10	15	20	28	33	44	52	60
Width (mm)	256	276	306	319	359	403	469	519	569	640	640	820	820	866	956	1018	1078	1148	1208
Depth (mm)	111	131	161	202	242	290	352	402	452	640	640	820	820	866	956	1018	1078	1148	1208
Height (mm)	337	388	497	486	631	825	1020	1183	1336	2240	2730	2875	3190	3555	3950	4120	4485	4720	5020
Width with floor standing frame (mm)	N/A	N/A	N/A	N/A	550	550	550	550	550	640	640	820	820	866	956	1018	1078	1148	1208
Depth with floor standing frame (mm)	N/A	N/A	N/A	N/A	550	550	550	550	550	640	640	820	820	866	956	1018	1078	1148	1208
Height with floor standing (mm)	N/A	N/A	N/A	N/A	1271	1465	1660	1823	1976	2590	3080	3225	3540	3865	4260	4480	4795	5030	5330
Installed Power (kW)	0.6	0.6	0.6	1	1	1	3	3	3	8.5	8.6	16.5	16.5	31	31	49	49	67	67
power consumption at 80 ºC (kW)	0.01	0.02	0.04	0.07	0.13	0.26	0.5	0.75	1.15	2.4	4.3	5.7	8	11	16	19	24	28	33
power consumption at 120 ºC (kW)	0.02	0.04	.08	0.12	0.23	0.45	0.85	1.23	1.82	3.5	6.3	8.4	11.8	17	23	28	35	42	49
power consumption at 180 ºC (kW)	0.03	0.06	0.11	0.18	0.35	0.69	1.31	1.93	2.88	4.6	8.1	11	15.6	22	30	37	46	55	64
Max. current at 400 V, 50 Hz (A)				12	12	12	20	20	20	13	13	24	24	45	45	70	70	97	97
Power supply (V, Phases, Hz)	230 / 1 / 50-60									400 / 3 / 50 or 480 / 3 / 60									

* Not applicable for *CARD E-Series*. The air flow in the *E-Series* is constant (Minimum air flow = maximum air flow)