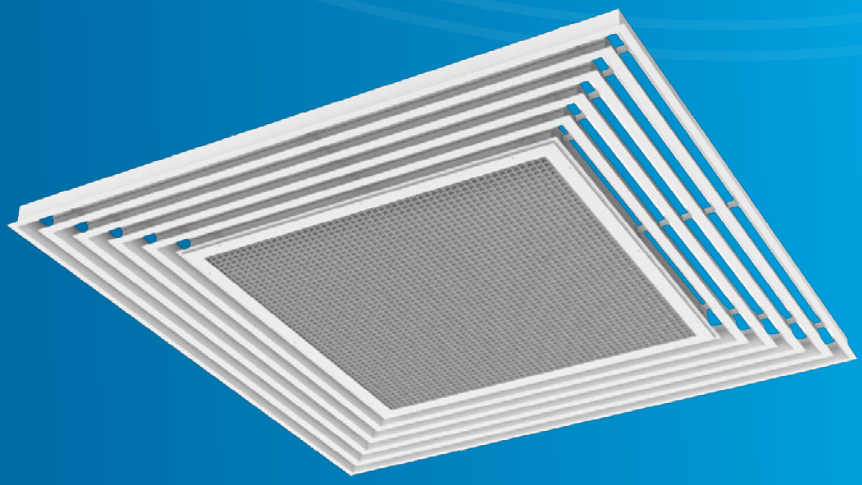
Concentric Supply/Return Diffusers

Models CSR & CSR-P



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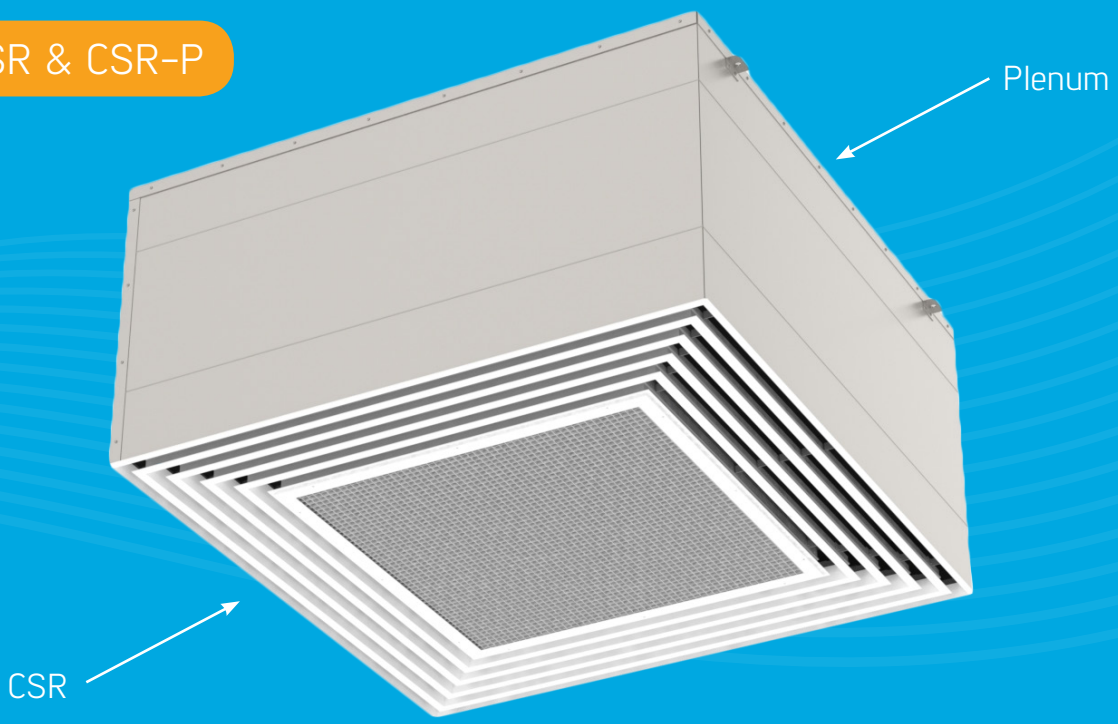
Titus

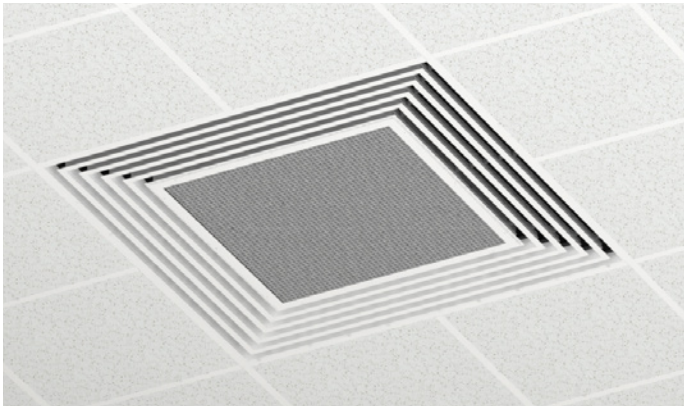
Models CSR & CSR–P



Rectangular Ceiling Diffuser Combination Supply/Return, High Capacity

The CSR-P is ideal for applications requiring a system that provides equal distribution on all four sides while maintaining low noise levels. It may be installed in a T-bar ceiling, plaster ceiling, or duct mounted in an open area.

Large commercial buildings, warehouses, and retail stores will find the CSR-P the prime selection for single point air distribution systems. Titus provides the entire plenum and diffuser in one piece. The assembled unit makes for an easy installation.



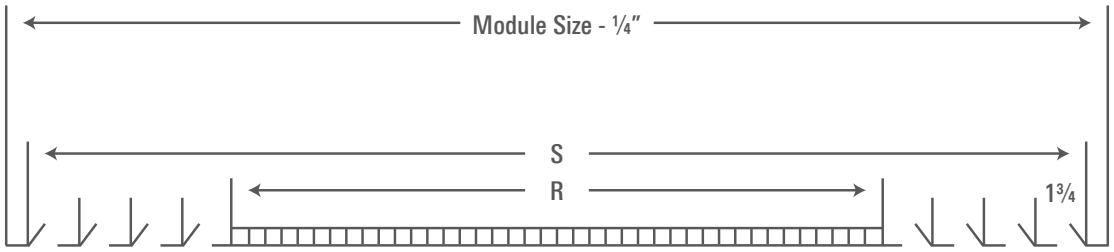
Rendering of a CSR / CSR-P installed in a ceiling

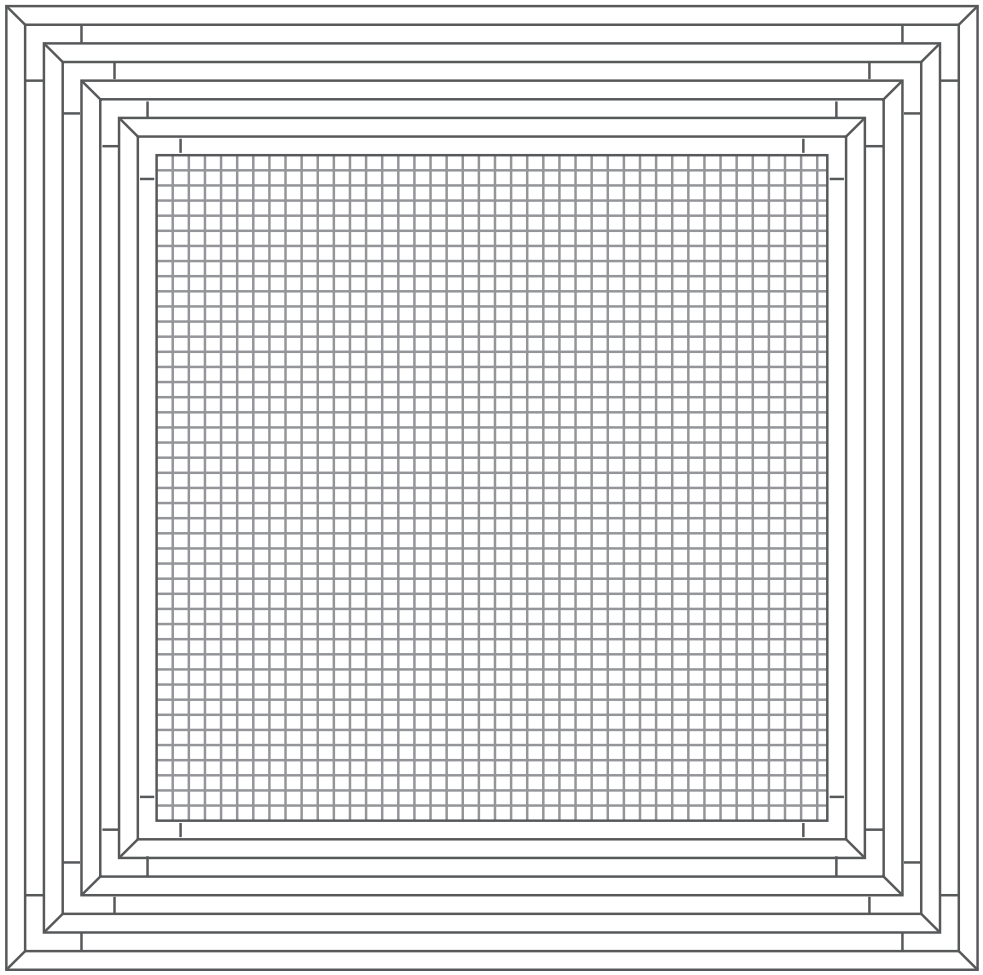
- The Titus CSR Series is designed to maximize the performance of a combined supply/return diffuser
- Supply and return air is handled through one air device
- The CSR and CSR-P are compatible with unitary package equipment from 2.5 to 25 tons
- Performance of CSR-P is certified and tested in accordance with ASHRAE 70-2006

Features and Benefits

- Four-way horizontal airflow
- Low noise, low pressure
- Anti-smudge
- Aluminum diffuser and return air eggcrate
- Lightweight design
- Built-in hanging support

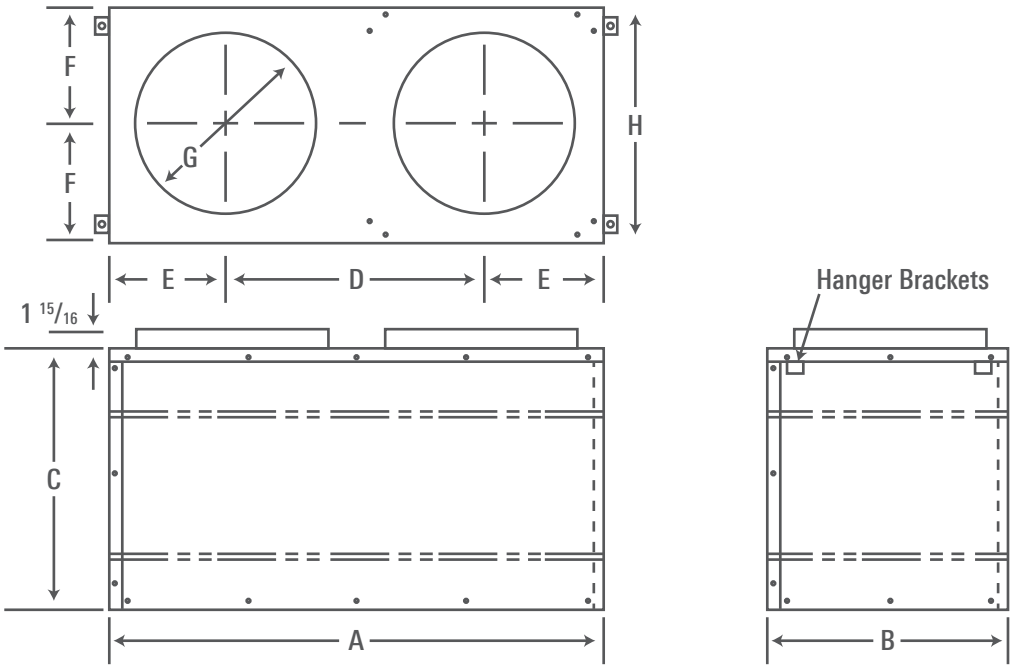
Dimensions



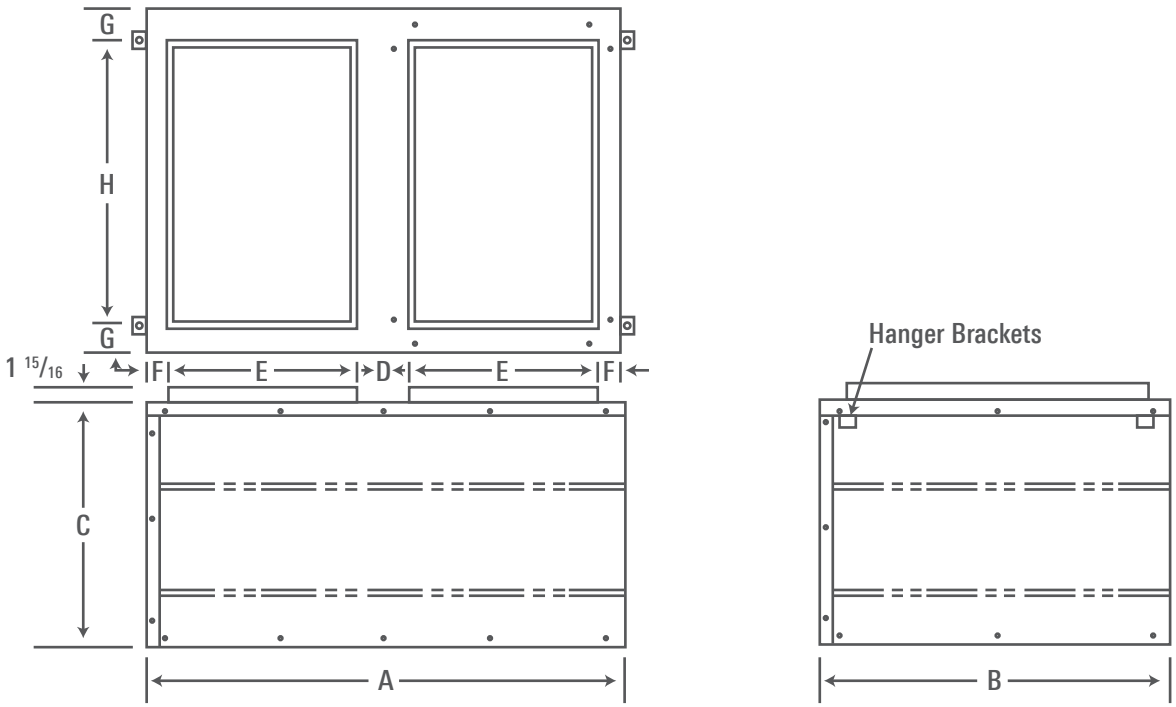


Nominal Tonage	Module Size	Supply Duct S	Return Duct R
2.5-5	48 x 24	46 3/4 x 22 3/4	36 1/8 x 12 1/8
6-10	48 x 36	46 3/4 x 34 3/4	32 11/16 x 20 11/16
10-15	48 x 48	46 3/4 x 46 3/4	29 1/8 x 29 1/8
15-25	60 x 60	58 3/4 x 58 3/4	37 11/16 x 37 11/16

Plenum Dimensions



Module Size	A	B	C	D	E	F	G	H
48 X 24	47	22 13/16	23 15/16	22 1/2	12 1/4	11 1/2	17 15/16	17 1/2



Module Size	A	B	C	D	E	F	G	H
48 x 36	47	35	23 15/16	4 15/16	17 7/8	3 1/8	3 9/16	27 7/8
48 x 48	47	47	23 15/16	4 15/16	17 7/8	3 1/8	5 9/16	35 7/8
60 x 60	59	59	23 15/16	4 15/16	23 7/8	3 1/8	5 9/16	47 7/8

Performance

CSR-P - 48" x 24"

Air Flow, CFM	1000	1500	2000	2500
Total System Static Pressure (Inches WC)	0.127	0.286	0.508	0.794
Supply Static Pressure (Inches WC)	0.052	0.117	0.208	0.326
Return Static Pressure (Inches WC)	-0.075	-0.168	-0.300	-0.468
NC (Noise Criterion)	14	24	31	36
Throw (Feet)	10-14-20	14-18-25	17-20-29	19-23-32

CSR-P - 48" x 36"

Air Flow, CFM	1500	2000	2500	3000	3500	4000	4500	5000
Total System Static Pressure (Inches WC)	0.073	0.129	0.202	0.291	0.396	0.517	0.654	0.808
Supply Static Pressure (Inches WC)	0.042	0.075	0.117	0.168	0.229	0.299	0.379	0.468
Return Static Pressure (Inches WC)	-0.031	-0.054	-0.085	-0.122	-0.167	-0.218	-0.275	-0.340
NC (Noise Criterion)	19	25	30	34	37	40	43	45
Throw (Feet)	12-18-25	16-20-29	19-23-32	20-35-35	22-27-38	23-29-41	25-32-43	26-32-46

CSR-P - 48" x 48"

Air Flow, CFM	2000	2500	3000	3500	4000	4500	5000	5500	6000
Total System Static Pressure (Inches WC)	0.075	0.117	0.169	0.230	0.300	0.380	0.469	0.567	0.675
Supply Static Pressure (Inches WC)	0.037	0.058	0.083	0.113	0.148	0.187	0.230	0.279	0.332
Return Static Pressure (Inches WC)	-0.038	-0.060	-0.086	-0.117	-0.152	-0.193	-0.238	-0.288	-0.343
NC (Noise Criterion)	7	23	28	32	35	38	41	44	46
Throw (Feet)	13-20-29	17-23-32	20-25-35	22-27-38	23-29-41	25-31-43	26-32-46	28-34-48	29-35-50

CSR-P - 60" x 60"

Air Flow, CFM	3000	4000	5000	6000	7000	8000	9000	10000
Total System Static Pressure (Inches WC)	0.069	0.123	0.193	0.278	0.378	0.494	0.625	0.772
Supply Static Pressure (Inches WC)	0.043	0.077	0.120	0.173	0.236	0.308	0.390	0.481
Return Static Pressure (Inches WC)	-0.026	-0.047	-0.073	-0.105	-0.142	-0.186	-0.235	-0.291
NC (Noise Criterion)	22	31	38	43	48	52	55	59
Throw (Feet)	16-25-35	22-29-41	26-32-46	29-35-50	31-38-54	33-41-54	35-43-61	37-46-64

Performance Notes:

1. NC based on a room, 68 feet wide by 80 feet long by 14 feet high with the receiver located 9 feet from the diffuser
2. Total System Static Pressure is the sum of the supply static pressure and the return static pressure
3. Throw is listed as the distance in feet to terminal velocities of 150, 100, and 5 fpm under isothermal conditions

A Suggested Guide for Specifying the CSR and CSR–P

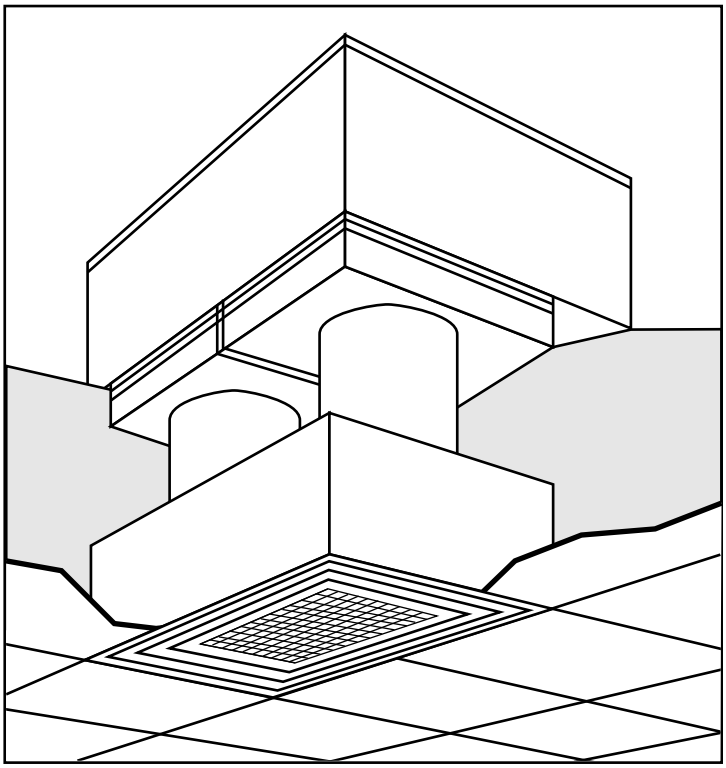
CSR-P Concentric Supply/Return Diffuser with Optional Plenum

Furnish and install Titus model CSR-P Concentric Supply/Return Diffusers of the sizes and capacities shown in the plans.

Specified roof top A.C. units will utilize a concentric supply/return diffuser assembly complete with fixed blade extruded concentric diffuser and plenum. The diffusers shall be compatible with 2½ - 25 ton unitary package equipment as shown in the plans. Assembly shall include peripheral supply and control return with an internal on piece low pressure drop distribution plenum to ensure even, four-way air distribution and low noise. Plenum distribution assembly must be internally sealed to prevent short circuiting and all internal walls of the plenum shall be insulated. Internal insulation must comply with UL 181 and NFPA 90A. All exposed insulation edges shall be coated with NFPA approved sealant to prevent erosion.

Entire plenum assembly to be supported via hanger brackets. Hanger brackets to be provided by Titus as an integral part of the plenum assembly. The assembly shall be capable of being installed in a T-bar ceiling, plaster ceiling, or duct mounted in an open area. No exposed fasteners, wood, or sheet metal adapters will be acceptable.

Titus shall provide complete performance data including CFM, Total System Static Pressure, Return Static Pressure, Noise Criterion and Throw for all sizes shown in the plans. Performance shall be certified and tested in accordance with ASHRAE 70-2006. Complete balancing data shall also be provided for each size shown in the plans.



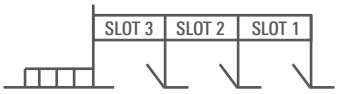
This CAD rendering illustrates the all-in-one plenum and diffuser designed as it works with unitary package equipment.

Balancing Data

Balancing Procedure

1. Measure slot velocities in 24 location as shown below
2. Calculate the average velocity from the 24 readings
3. The air flow in cfm = Flow Factor * Average Velocity

Size	Flow Factor
48 x 24	1.32
48 x 36	2.11
48 x 48	2.87
60 x 60	4.65

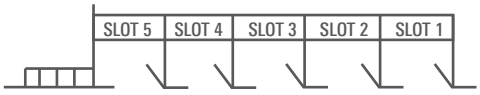


Record Velocities in all Three Slots

48 x 24
3 SLOTS

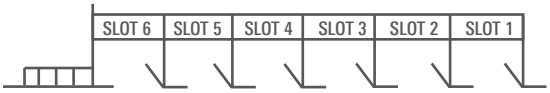
Record Velocities in Slots 1, 2, and 3

48 x 36
4 SLOTS



Record Velocities in Slots 2, 3, and 4

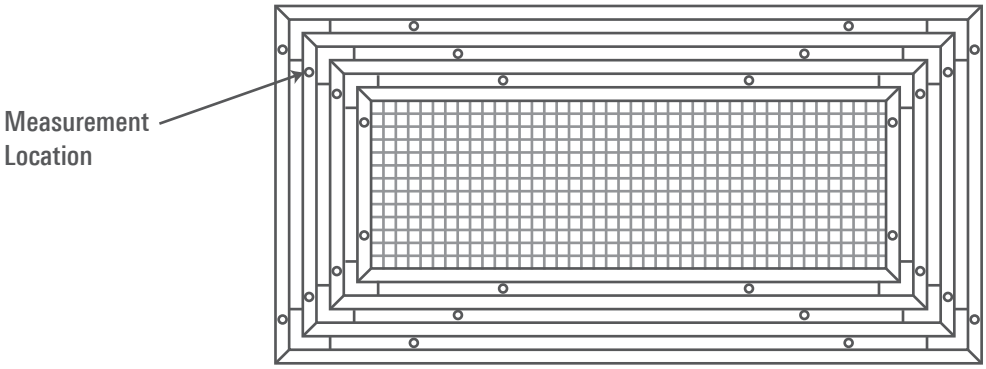
48 x 48
5 SLOTS

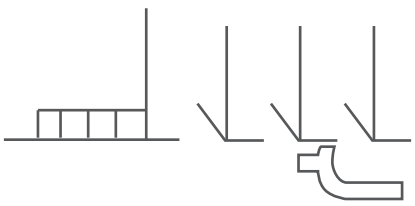


Record Velocities in Slots 2, 3, and 5

60 x 60
6 SLOTS

Slot Velocity Measurement Locations





Alnor 6070P Velometer Probe Orientation

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