EQUIPOTENTIAL BONDING GRID:

ALL METAL PARTS SPECIFIED IN 680.26(B) MUST BE BONDED TO AN EQUIPOTENTIAL BONDING GRID WITH A SOLID COPPER CONDUCTOR NOT SMALL THAN 8 AWG. THE TERMINATION OF THE BONDING CONDUCTOR MUST BE MADE BY EXOTHERMIC WELDING, LISTED PRESSURE CONNECTORS, OR LISTED CLAMPS THAT ARE LABELED AS SUITABLE FOR THE PURPOSE. THE QUIPOTENTIAL BONDING GRID MUST EXTEND UNDER PAVED WALKING SURFACES FOR 3 FEET HORZONTALLY FROM THE WATER (680.26(C)).

THE EQUIPOTENTIAL BONDING GRID MUST BE FORMED FROM EITHER OR BOTH OF:

THE STRUCTURAL REINFORCING STEEL OF A CONCERTE PERMANENTLY INSTALLED POOL, OUTDOOR SPA, OR OUTDOOR HOT TUB, TIED TOGETHER BY THE USUAL STEEL TIE WIRES.

THE METAL WALLS OF A PERMANENTLY INSTALLED POOL, OUTDOOR SPA, OR OUTDOOR HOT TUB

THE EQUIPOTENTIAL BONDING GRID CAN BE CONSTRUCTED WITH 8 AWG BARE SOLID COPPER CONDUCTORS BONDED TO EA OTHER AT ALL POINTS OF CROSSING BY EXOTHERMIC WELDING, LISTED PRESSURE CONNECTORS OF THE SET SCREW OR COMPRESSION TYPE, LISTED CLAMPS, OR OTHER LISTED FITTINGS (250.8).

THE EQUIPOTENTIAL BONDING GRID MUST COVER THE CONTOUR OF THE PERMANENTLY INSTALLED POOL, OUTDOOR SPA OR HOT TUB AND DECK EXTENDING 3 FEET HORIZONTALY FROM THE WATER. THE EQUIPOTENTIAL BONDING GRID MUST BE ARRANGED IN A 1-FOOT BY 1-FOOT NETWORK OF 8 AWG CONDUCTORS, WITH A TOLERANCE OF 4 INCHES.

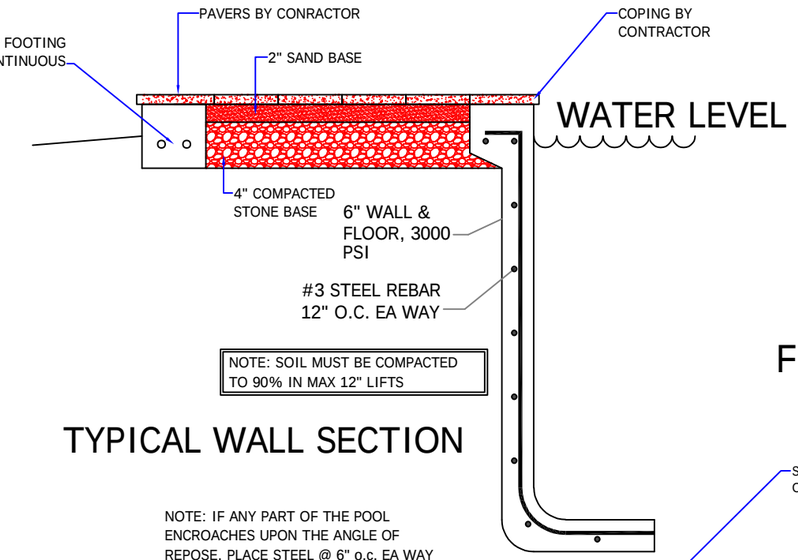
EXCEPTION: THE EQUIPOTENTIAL BONDING GRID SHALL NOT BE REQ'D TO BE INSTALLED UNDER THE BOTTOM OR VERTICALLY ALONG THE WALLS OF VINYL LINED POLYMER WALL, FIBERGLASS COMPOSITE, OR OTHER POOLS CONSTRUCTED OF NON-CONDUCTIVE MATERIALS.

ANY METAL PARTS OF THE POOL, INCLUDING METAL STRUCTURAL SUPPORTS, SHALL BE BONDED IN ACCORDANCE WITH 680.26(B). POURED CONCRETE, PNEUMATICALLY-APPLIED CONCRETE, AND CONCRETE BLOCK SHALL BE CONSIDERED CONDUCTIVE MATERIAL

GENERAL NOTES:

1) Per UL listing, pool motors require GFCI protection
2) FSPA requires the motor controller to be capable of 2 speeds, a time clock will not satisfy this unless it has 2 trip settings.
3) If heater installed (other than solar), it must comply with FBC-EC403.9.1 & have a cover per 403.9.3 (this applies to mechanical (not solar) heaters---cover required)
4) Outdoor swimming pools shall be provided with a barrier complying with Sections R4501.17.1.1 through R4501.17.1.14.
5) NEC 680.26(C) requires a conductive metal part of 9 sq., in. in direct contact with the pool water.
6) R4501.17.1.9 All doors and windows providing direct access from the home to the pool shall be equipped with an exit alarm complying with UL 2017 that has a minimum sound pressure rating of 85 dB at 10 feet.

STEPS: MIN. TREAD 10" x 12", 7" MIN RISER, 12" MAX RISER.
INTERMEDIATE TREADS AND RISERS TO BE UNIFORM.



TYPICAL WALL SECTION

NOTE: IF ANY PART OF THE POOL ENCROACHES UPON THE ANGLE OF REPOSE, PLACE STEEL @ 6" o.c. EA WAY IN AREAS OF QUESTION

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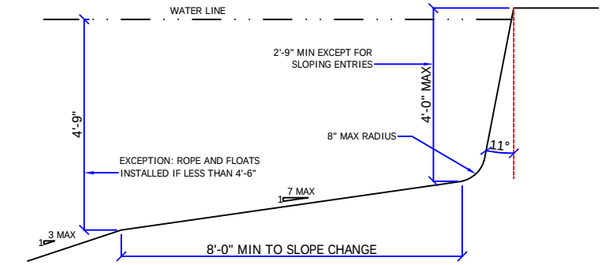
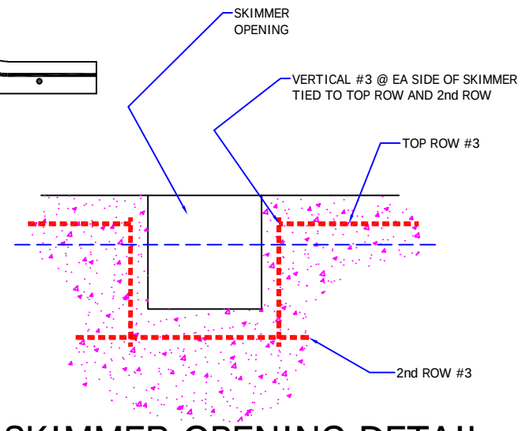
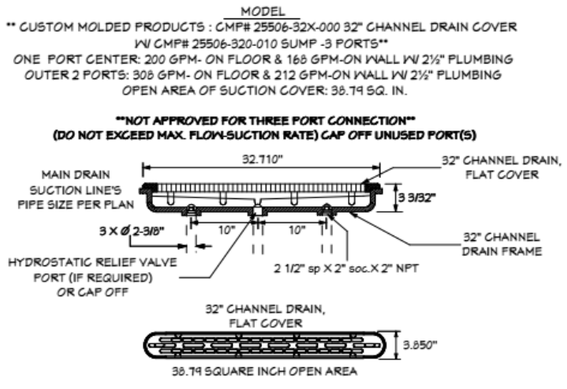


FLOOR SLOPE DETAIL NTS



SKIMMER OPENING DETAIL



ENGINEERING NOTES:

1. ALL WORK IS TO COMPLY WITH ALL APPLICABLE CODES & ORDINANCES.
2. CONSTRUCTED OF 3000 PSI CONCRETE OR EQUAL WITH #3 REBAR 12" O.C. EACH WAY, TIED AT EVERY OTHER INTERSECTION. MIN COVER FOR REBAR IS 2.5" MIN OVERLAP IS 18".
3. N/A
4. ASSUMED SOIL BEARING = 2 KSF
5. CIRCULATION SYSTEMS, COMPONENTS, & EQUIPMENT SHALL COMPLY W/ NSF 50.
6. INSTALL CONTROL JOINTS @ 20'-0" ON CENTER IN POOL DECKING.
7. PLANS TO CONFORM TO NEC 2020
8. 2023 FBC RESIDENTIAL 8th EDITION APSP13
9. CONCRETE STAIRS ARE 12" TREAD WIDTH AND 10" MAXIMUM HEIGHT
10. ALL CONSTRUCTION SHALL COMPLY WITH ANSI 5-03, 2020 NEC ARTICLE 680, & ANSI-NSPI 3-99 IN-GROUND SPA CONSTR.

*11. ENGINEERS DESIGN IS FOR STRUCTURAL ONLY. DESIGN OF PIPING/EQUIPMENT ETC.

BY POOL CONTRACTOR

FENCE REQUIREMENTS:

1. MINIMUM 48" HEIGHT
2. 2" MAX VERTICAL CLEARANCE BETWEEN GRADE & BARRIER BOTTOM.
3. MAX OPENING SHALL NOT ALLOW PASSAGE OF 4" SPHERE.
4. FENCE POSTS WILL BE LOCATED ON POOL-SIDE OF FENCE.
5. GATE WILL BE SELF-LOCKING WITH APPROVED LOCKING DEVICE.

Riddle Consulting Engineers, Inc.

structural civil mechanical

Paul D. Riddle, P.E.
Senior Engineer
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ENGINEER'S SEAL

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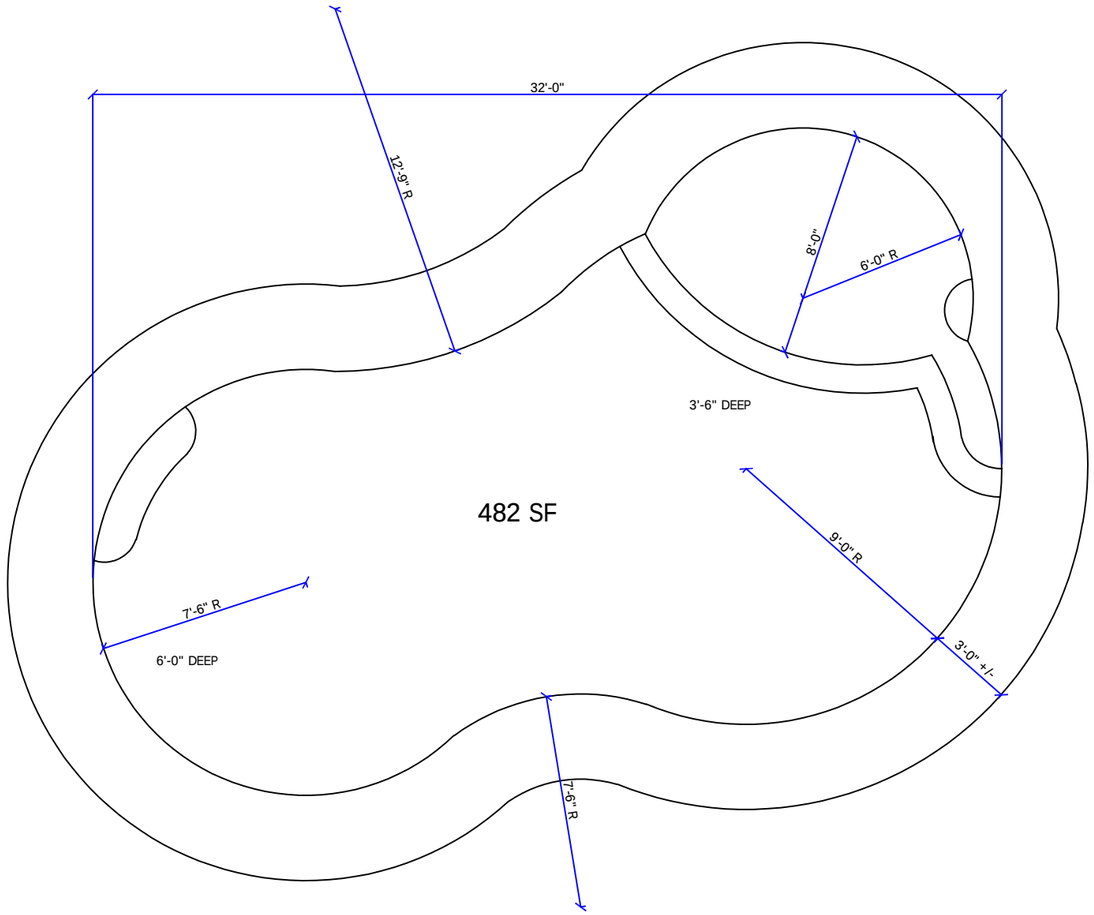
JOB No.:	2250048
DATE	Oct. 3, 25

A CUSTOM DESIGN FOR
THE JOHNSON RESIDENCE
AQUATIC ART POOLS AND SPAS

3/16" = 1'-0" SCALE



POOL EQUIPMENT

Riddle Consulting Engineers, Inc.

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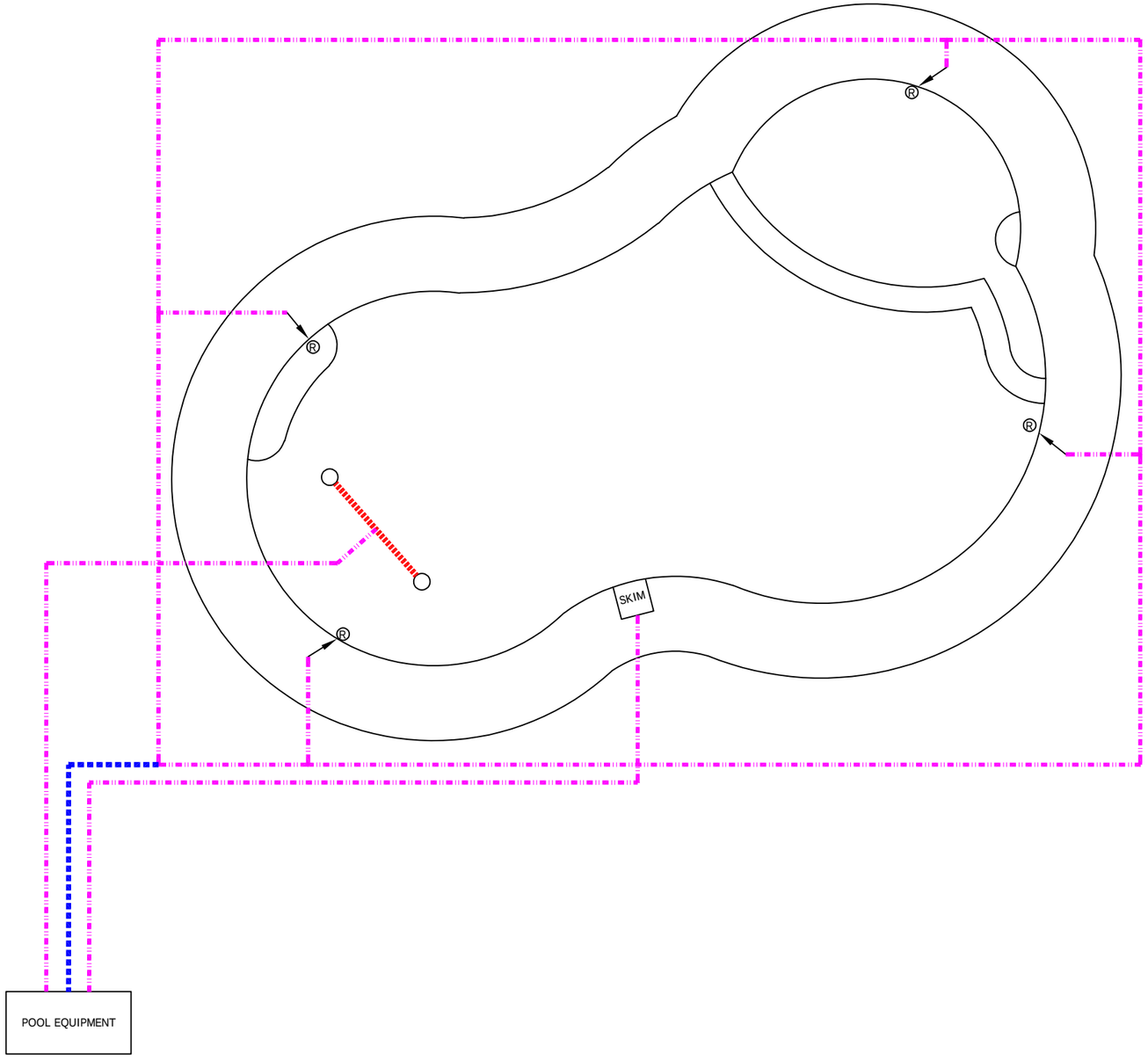

PIPING KEY

2" ⌀ LINE

2.5" ⌀ LINE

3" ⌀ LINE

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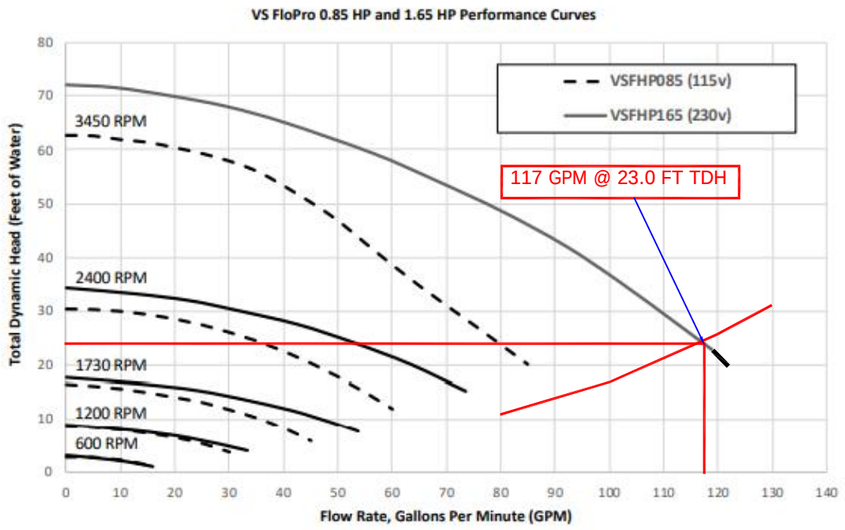
SPECIFICATIONS

Model No.	THP	WEF[3]	Voltage	Max Watts	Amps	Union Size	Rec. Pipe Size[4]	Carton Weight	Overall Length
VSFHP165JEP VSFHP165AUT	1.65	9.118	230VAC	1,600 W	10.5	2" × 2"	1 1/2 – 2 1/2"	46 lbs	24"
VSFHP085JEP VSFHP085AUT	0.85	11.900	115VAC	975 W	10.0	2" × 2"	1 1/2 – 2"	46 lbs	24"

PERFORMANCE



AQUATIC ART — **JOHNSON**

10/3/2025

MINIMUM FLOW REQ'D = 127.57 GPM
POOL VOLUME : SURFACE AREA X AVG DEPTH X 7.48 GAL / CF
VOL = 482 SF X 4.75 FT DEEP 17125.46 Gallons
TURNOVER TIME: No. Hours X 60 min / ho e
6 hours x 60= 360 minutes
MAX POOL FLOW RATE: GALLONS / TURNOVER = FLOW RATE
17125.46 GAL / 360 minutes = 47.5707222 GPM
POOL FEATURES
JETS, SHEER DE 4 WATER FEATURE GPM EA = 80 GPM
TOTAL SUGGESTED POOL FLOW RATE: 127.57 GPM
V = 1.318 C R^.63 S^.54

SUPPLY (RETURN) PIPING

2.5 in = NOMINAL DIAMETER
2.45 in = D ACTUAL diam
0.2038 ft = D diam
140 = C, coefficient of roughness
4.6951 in^2 = A pipe
0.0326 ft^2 = A pipe
117.00 gpm / line 0.2606952 cfs
117.00 gpm = TOTAL FLOW IN 1 LINES
0.2607 cfs = Q flow M
7.9955 f/sec = V = Velocity
0.0509 ft = R = Hydraulic Radius = A / P
0.0964 ft/ft = S hydraulic gradient
13 ft = pipe length average
1.25 ft = hf = head loss due to friction
0.54 psi 0.0054244

SUCTION PIPING

2 in = NOMINAL DIAMETER
2.05 in = D ACTUAL diam
0.1706 ft = D diam
140 = C, coefficient of roughness
3.2910 in^2 = A pipe
0.0229 ft^2 = A pipe
58.50 gpm = 0.1303476 cfs
2 No of Suction Pipes
0.1303 cfs = Q flow rate
5.7035 f/sec = V = Velocity
0.0426 ft = R = Hydraulic Radius = A / P
0.0634 ft/ft = S hydraulic gradient
34 ft = pipe length average
2.16 ft = hf = head loss due to friction
0.93 psi 0.0093374

BRANCH P model		FLOW GPM	STR FT	PSI
2 in @ 6 fps max BRANCH =	61.54 GPM	80.00	10.6	4.59
2 in @ 8 fps max TRUNK =	82.06 GPM	100.00	16.3	7.06
2 in @ 10 fps max RETURN =	102.57 GPM	120.00	24.7	10.69
3 in @ 3 fps max RETURN =	67.95 GPM MAIN	130.00	30.7	13.29
	DRAIN	140.00	37.2	16.10

FT 23.0 PSI 9.9688544

OTHER PRESSURE LOSSES per mnfg

6.98 FT = FILTER TDH LOSS — JANDY PRO SERIES CS150-250 CARTRIDGE FILTER
0.00 FT = HEATER TDH LOSS — NA
6.98 FT = TOTAL TDH LOSS

MINOR LOSSES (SUPPLY & SUCTION COMBINED)

h (lost) = KL * V^2 / (2*g)

		K	h (lost) ft	
2 ea = # tees thru side outlet		1.75	3.47	
2 ea = # gate valves		1	1.99	
1 ea = # check valves		0.2	0.20	
0 THERAPY JET		21.73	0.00	
0 ea = # 45 deg ELL		0.4	0.00	
6 ea = # 90 deg ELL		0.75	4.47	
0 ea = Reducer D2=	0.5	0.0871791	0.00	D1/D2= 4.89
		TOTAL =	10.13 ft	

ELEVATION DIFFERENCE

0.00 ft = delta Z

model

2.52 FT = TOTAL FRICTION HEAD LOSS AFTER SPLIT @ LOOP
23.03 FT = TOTAL HEAD LOSS IN SYSTEM @ 117.00 GPM
9.97 PSI

PUMP SELECTION : JANDY 1.65 VS PUMP
model: VARIABLE SPEED

SUCTION OUTLET COVER: MUST EXCEED 117.00 GPM FLOW RATE
model 32" CHANNEL DRAIN OR 2 OUTLET COVERS

SYSTEM FLOW RATE MUST NOT EXCEED APPROVED COVER FLOW RATE O.K.

PER FBC 2023 8TH EDITION ANSI / APSP 13

MOTOR TO BE GFCI PROTECTED PER NEC 680.21©

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