

customer:

date: 13.08.2021

Harman Professional Denmark ApS.
Olof Plames Allé 14

8200 Aarhus N
Denmark

project No: 21000131-1

inspection order: Photometric measurement according DIN EN 13032-1,
EN 13032-4:2015 and IES LM-79-08

- measurement of intensity distribution
- measurement of luminous flux

measurement procedure: - measurement with goniophotometer according DIN EN 13032

test sample specification:

luminaire: LED fixture for stage and studio, direct beam

description: MAC Ultra Performance - narrow

Serial No.: 15063403503

power supply: Electronics, integrated

DMX settings: zoom: 60416
focus: 0
Fans: Constant Fan Full

test sample dimensions:

luminaire dimensions:

length:	300 mm
width:	450 mm
height:	865 mm
diameter:	- mm

dimensions of luminant areas:

length:	- mm
width:	- mm
height:	- mm
diameter:	160 mm

measurement configuration:

	area	step size
C- planes	0 - 360°	1°
γ- angle	0 - 5°	0.2°
	5 - 90°	5°

luminaire position: hanging, light beam vertical

light center: central, bottom of light output

test results:

stabilization time: 30 min.

stability of luminous flux: < 1%

luminous flux:

upper half space	lower half space	overall
-	29004,41 lm	29004,41 lm
-	100 %	100 %

max. luminous intensity: 2990525,0 cd @ ($\gamma=0^\circ/C=0^\circ$)
 beam angles:

half beam 50 % :	6,6°
field angle 10% :	8,0°
cutoff angel 3% :	8,6°

symmetry condition: rotational symmetric

luminous efficiency: 20,68 lm/W

electrical operating conditions:

voltage:	230,0 V (const. < 0.1%)
current:	6,135 A
system power:	1402,40 W
power factor:	0,994

ambient temperature:

T = 25° C ± 1° C

The company ILUmetriX insures that all statements are made by the best of knowledge, according to European standards.

Meschede, 13.08.2021



F. Siepe (Management Board)



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	page 11	testequipment

PHOTOMETRIC RESULTS

Manufacturer:	Harman Professional ApS	Voltage:	230,02 V
Name:	MAC Ultra Performance - narrow	Current:	6,135 A
Report:	21000131-1	System Power:	1402,4 W
Date:	12.08.2021 14:09:54		
Operator:	F. Siepe	No. of lamps:	1
		MAC Ultra Performance - narrow	
Luminaire dimensions:			
Length:	300 mm		
Height:	865 mm		
Width:	450 mm		
Diameter:	0 mm		

Cones (C0-359-1, G0-90-1/25, S7)

LiTG-class:	A60		
UTE-class:	Not available		
IES-class:	100 - 100 - 100 - 100 - 100		
TM5-class:	Not available		
Divergences in the plane through maximum intensity:	Horizontal	Vertical	
One half peak divergence:	6,6°	6,6°	
Half peak side angle (left):	-3,3°	-3,3°	
Half peak side angle (right):	3,3°	3,3°	
One tenth peak divergence:	8,0°	8,0°	
Tenth peak side angle (left):	-4,0°	-4,0°	
Tenth peak side angle (right):	4,0°	4,0°	

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Intensity [cd] MAC Ultra Performance - narrow

G/C [cd]	0,0
0,0	2990525,0
0,2	2983720,0
0,4	2969057,0
0,6	2961081,0
0,8	2933996,0
1,0	2905678,0
1,2	2859721,0
1,4	2765161,0
1,6	2733314,0
1,8	2595149,0
2,0	2542093,0
2,2	2363750,0
2,4	2296076,0
2,6	2147776,0
2,8	2019954,0
3,0	1845446,0
3,2	1702483,0
3,4	1246877,0
3,6	760609,8
3,8	637427,2
4,0	284348,8
4,2	145049,1
4,4	9634,3
4,6	7660,6
4,8	6218,6
5,0	5399,4
10,0	700,3
15,0	237,2
20,0	123,9
25,0	75,0
30,0	57,6
35,0	61,5
40,0	59,2
45,0	51,6
50,0	44,3
55,0	35,1
60,0	16,9
65,0	7,1
70,0	3,5
75,0	0,7
80,0	0,1
85,0	0,1
90,0	0,1

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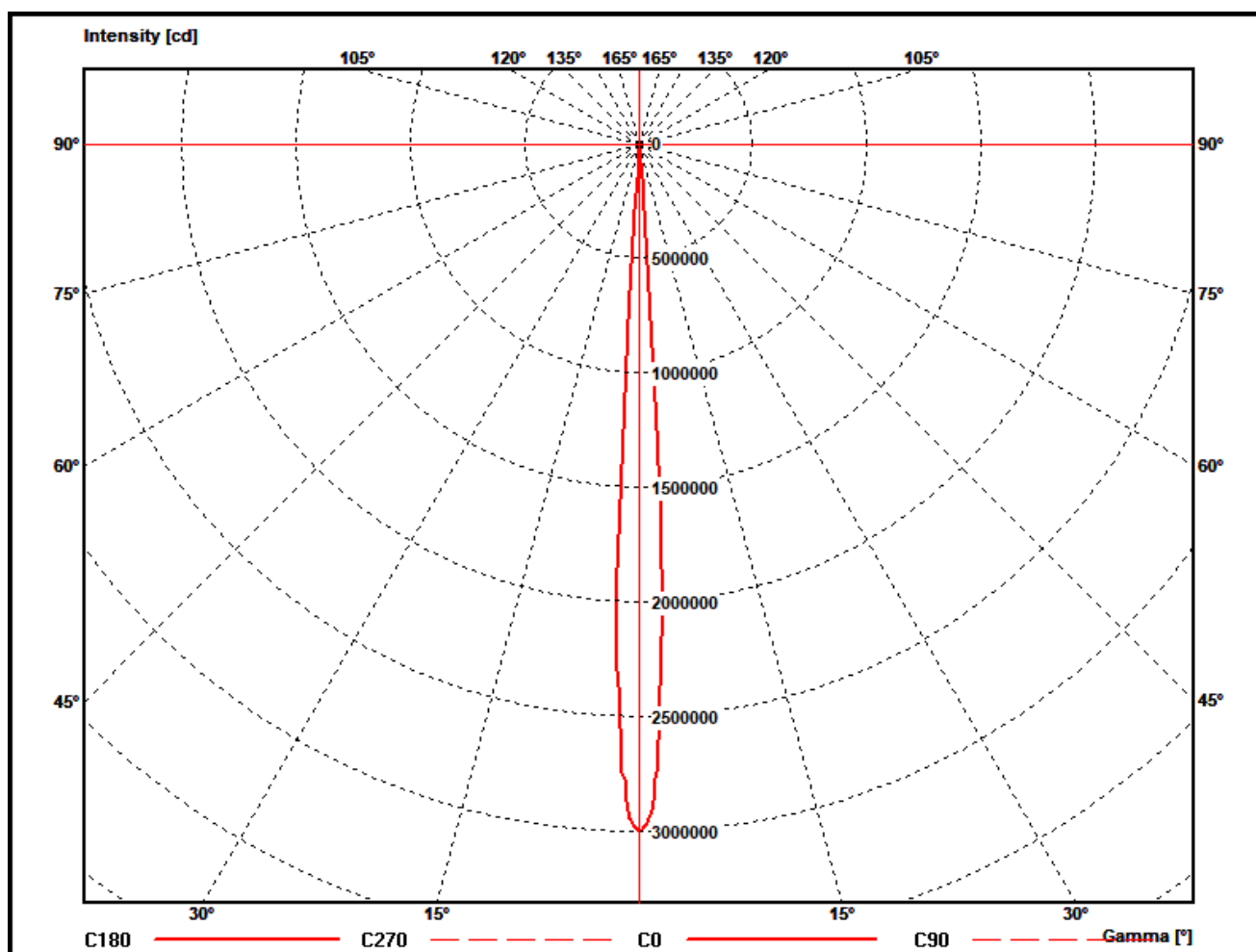
Zonal flux MAC Ultra Performance - narrow

Gamma [°]	Imin [cd/klm]	Imax [cd/klm]	Imean [cd/klm]	Zonal flux [lm]	Sum. zonal flux [lm]	Rel. zonal flux [%]	Sum. rel. zonal flux [%]
0,0	103105,9	103105,9	103105,9	0,00	0,00	0,00	0,00
0,2	102871,3	102871,3	102871,3	114,35	114,35	0,39	0,39
0,4	102365,7	102365,7	102365,7	341,80	456,15	1,18	1,57
0,6	102090,7	102090,7	102090,7	567,50	1023,64	1,96	3,53
0,8	101156,9	101156,9	101156,9	789,79	1813,43	2,72	6,25
1,0	100180,6	100180,6	100180,6	1005,88	2819,32	3,47	9,72
1,2	98596,1	98596,1	98596,1	1213,75	4033,07	4,18	13,91
1,4	95335,9	95335,9	95335,9	1399,44	5432,51	4,82	18,73
1,6	94237,9	94237,9	94237,9	1578,41	7010,91	5,44	24,17
1,8	89474,3	89474,3	89474,3	1733,49	8744,40	5,98	30,15
2,0	87645,1	87645,1	87645,1	1867,84	10612,23	6,44	36,59
2,2	81496,2	81496,2	81496,2	1971,38	12583,61	6,80	43,39
2,4	79163,0	79163,0	79163,0	2050,76	14634,38	7,07	50,46
2,6	74050,0	74050,0	74050,0	2125,67	16760,04	7,33	57,78
2,8	69643,0	69643,0	69643,0	2152,97	18913,01	7,42	65,21
3,0	63626,4	63626,4	63626,4	2144,58	21057,59	7,39	72,60
3,2	58697,4	58697,4	58697,4	2104,07	23161,65	7,25	79,86
3,4	42989,2	42989,2	42989,2	1861,81	25023,46	6,42	86,27
3,6	26223,9	26223,9	26223,9	1343,96	26367,42	4,63	90,91
3,8	21976,9	21976,9	21976,9	989,36	27356,78	3,41	94,32
4,0	9803,6	9803,6	9803,6	687,53	28044,30	2,37	96,69
4,2	5000,9	5000,9	5000,9	336,67	28380,97	1,16	97,85
4,4	332,2	332,2	332,2	127,19	28508,16	0,44	98,29
4,6	264,1	264,1	264,1	14,88	28523,04	0,05	98,34
4,8	214,4	214,4	214,4	12,47	28535,51	0,04	98,38
5,0	186,2	186,2	186,2	10,88	28546,39	0,04	98,42
10,0	24,1	24,1	24,1	218,20	28764,60	0,75	99,17
15,0	8,2	8,2	8,2	55,61	28820,21	0,19	99,36
20,0	4,3	4,3	4,3	29,76	28849,96	0,10	99,47
25,0	2,6	2,6	2,6	20,86	28870,83	0,07	99,54
30,0	2,0	2,0	2,0	16,78	28887,61	0,06	99,60
35,0	2,1	2,1	2,1	17,54	28905,15	0,06	99,66
40,0	2,0	2,0	2,0	20,13	28925,29	0,07	99,73
45,0	1,8	1,8	1,8	20,51	28945,80	0,07	99,80
50,0	1,5	1,5	1,5	19,37	28965,17	0,07	99,86
55,0	1,2	1,2	1,2	17,25	28982,43	0,06	99,92
60,0	0,6	0,6	0,6	12,02	28994,45	0,04	99,97
65,0	0,2	0,2	0,2	5,84	29000,28	0,02	99,99
70,0	0,1	0,1	0,1	2,68	29002,97	0,01	100,00
75,0	0,0	0,0	0,0	1,10	29004,07	0,00	100,00
80,0	0,0	0,0	0,0	0,23	29004,30	0,00	100,00
85,0	0,0	0,0	0,0	0,07	29004,37	0,00	100,00
90,0	0,0	0,0	0,0	0,05	29004,41	0,00	100,00

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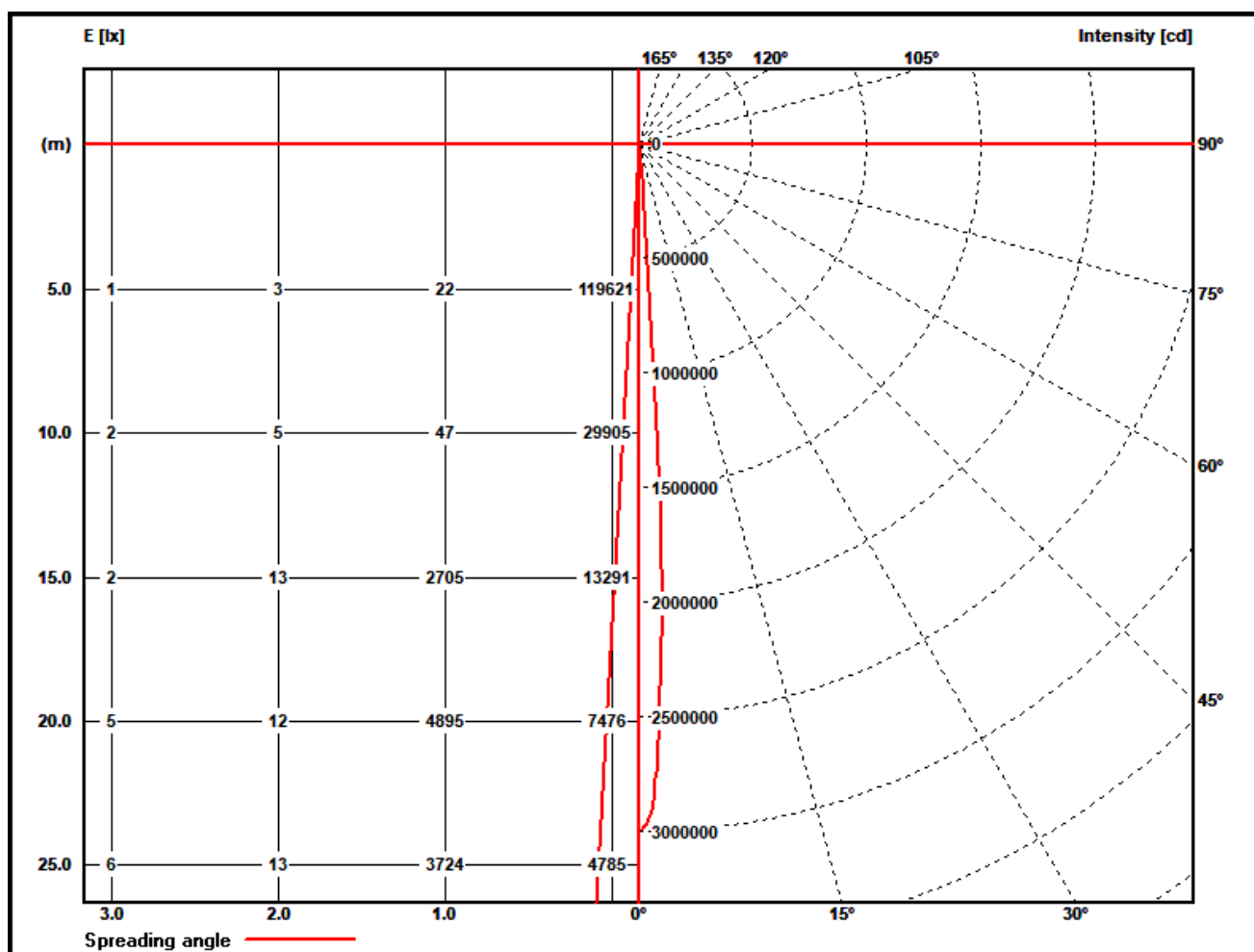
Polar diagram MAC Ultra Performance - narrow



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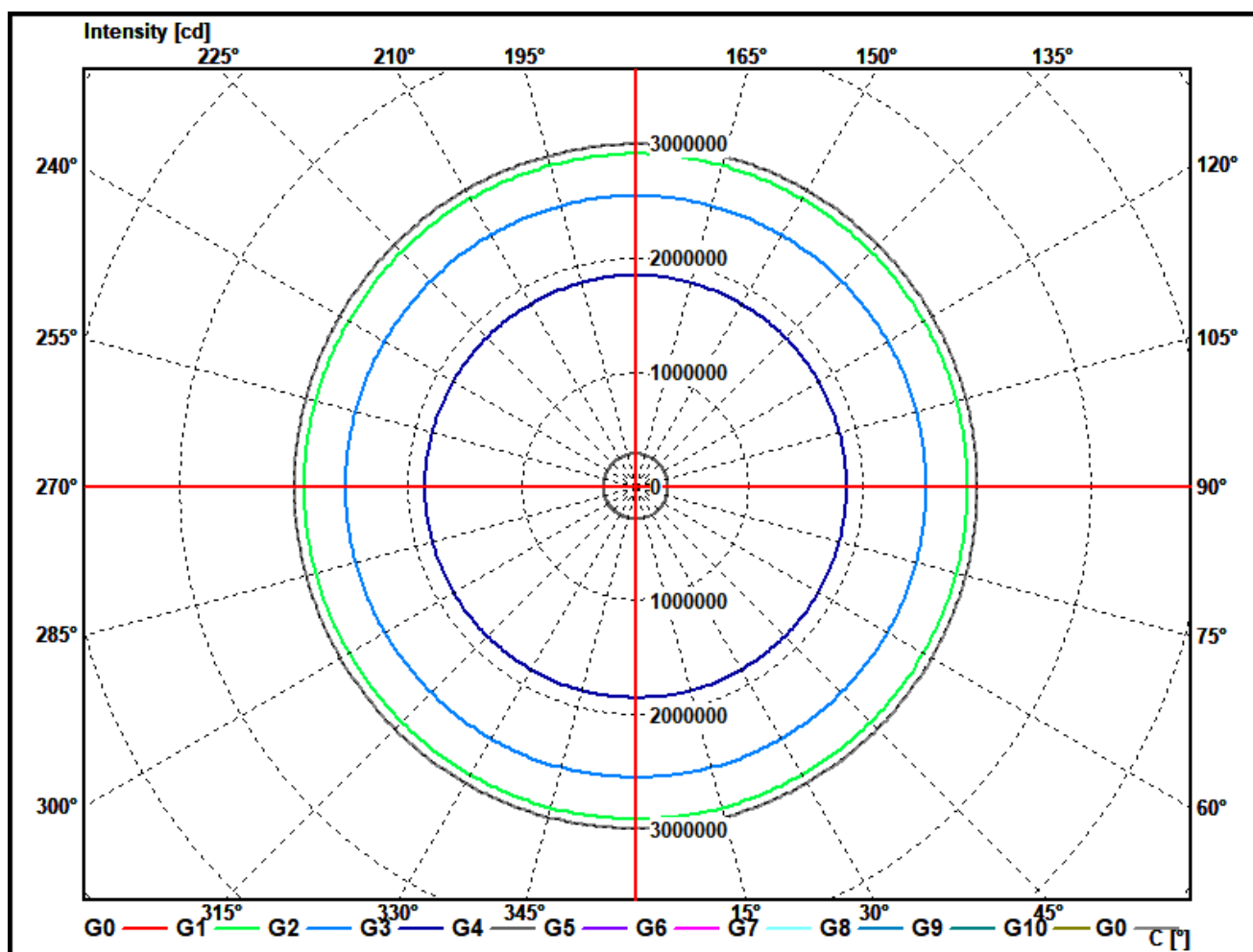
Illuminance and Intensity diagram MAC Ultra Performance - narrow



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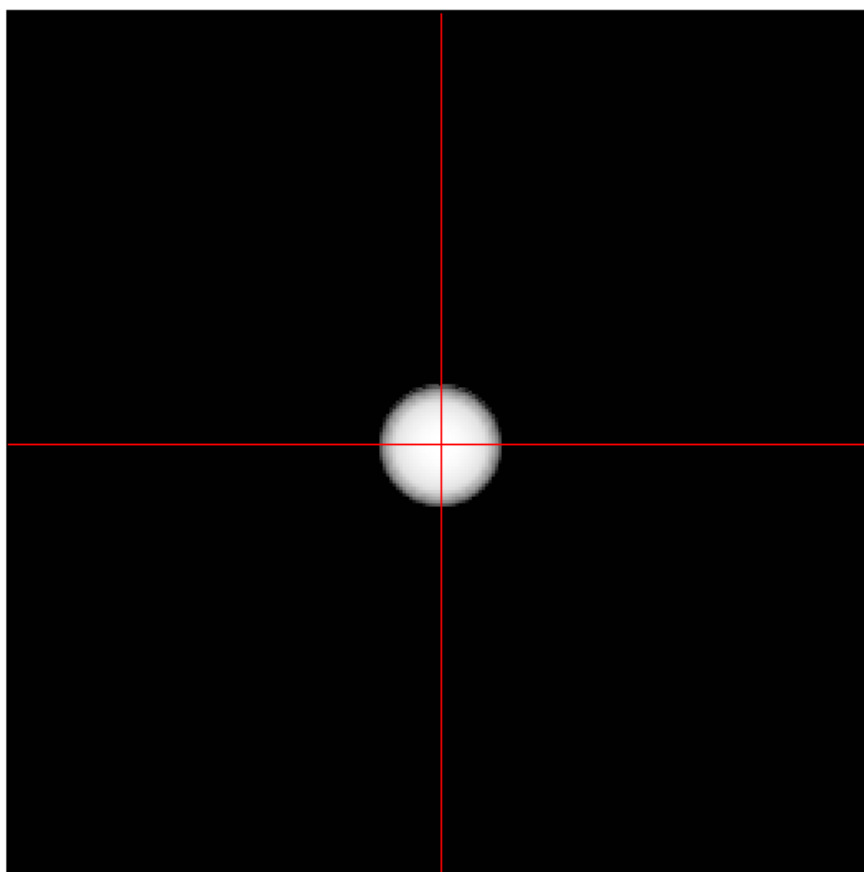
Cone diagram MAC Ultra Performance - narrow



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Isoline diagram MAC Ultra Performance - narrow



Luminaire mounting height above ground: 15 m
Luminaire rotation angle: 0 °

testsample:

dimensions [L x W x H]: 300 x 450 x 865 mm



test equipment - ILUmetriX GmbH

- goniophotometer with mirror arrangement GO-DS 2000 No.: 09A84831	Manufacturer: LMT GmbH, Berlin
- Photometer head GO-DS 2000, Nr.: 09A84812	Manufacturer: LMT GmbH, Berlin
- integrating sphere UL 1650/2250, Nr.: 09A8482	Manufacturer: LMT GmbH, Berlin
- colormeter C 1210 with colorimeterhead CH60	Manufacturer: LMT GmbH, Berlin
- power supply, Chroma 6415	Manufacturer: Chroma ATE INC.
- powermeter, Yokogawa WT 2010	Manufacturer: Yokogawa, Japan

calibration data:

goniophotometer with mirror arrangement

photometer unit with photometer head SP30S0T-GODS Serial No.: 09A84811 mit 09A84812	October 2018
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integrating sphere

colormeter with colorimeterhead Type: C 1210 with CH 60 serial No. 09A84831 mit 09A84832	October 2018
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