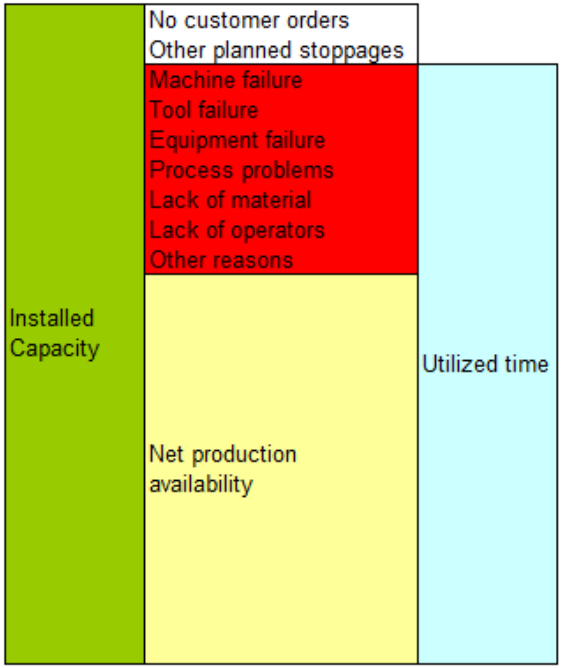
Production Performance Measurement

Production Performance Measurement - Utilization

$$\textbf{Capacity Utilisation (\%)} = \frac{\overbrace{\text{Installed capacity} - \text{no customer orders \& other planned stoppages}}^{\text{utilized time}}}{\text{Installed capacity}}$$

Installed capacity:
- Total theoretical available machine hours in the period (equals installed capacity) should be based on existing agreed shift structures.
- Holidays and non working time are excluded



$$\textbf{Utilization (\%)} = \frac{\text{Utilizied time}}{\text{Installed capacity}} \times 100$$

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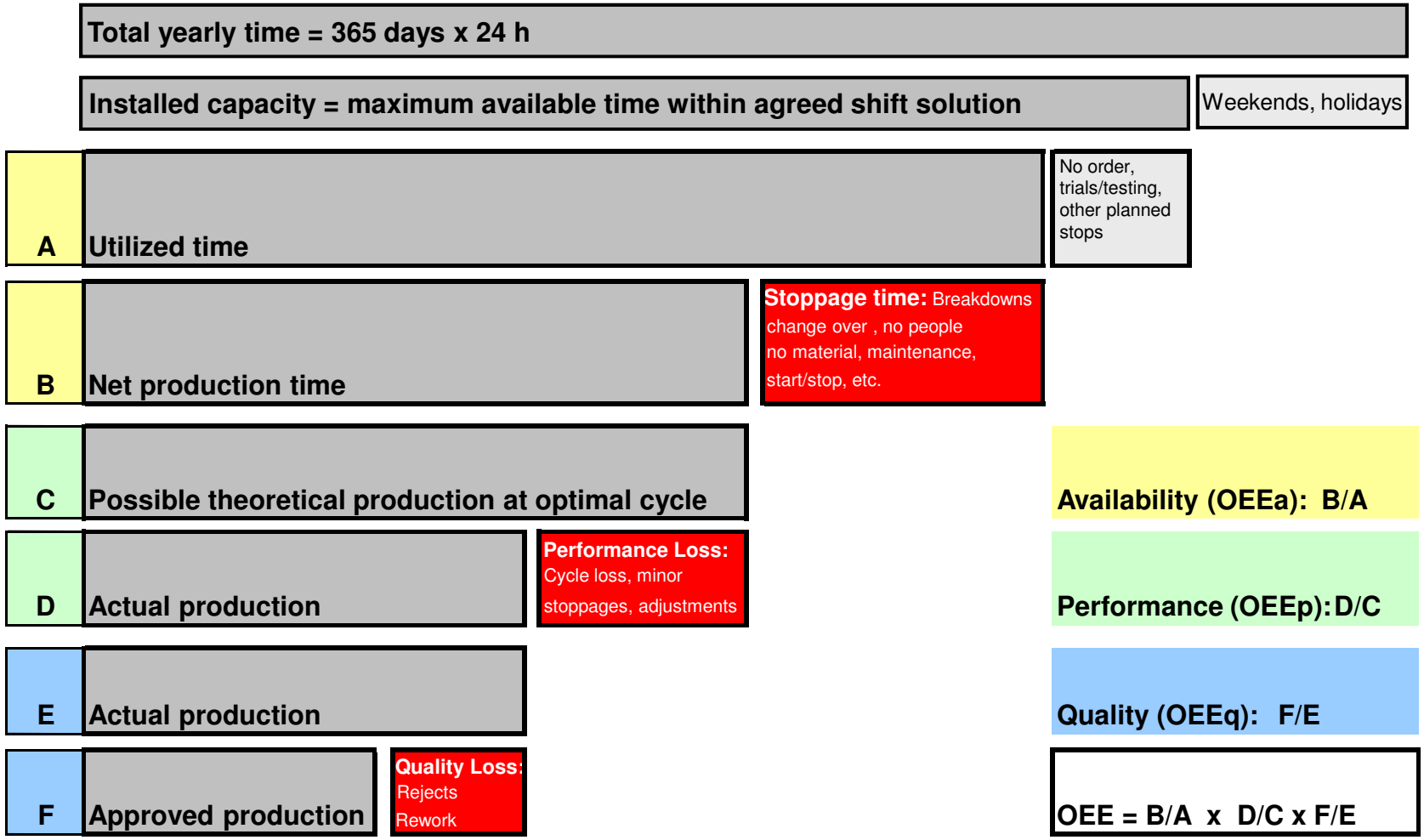
Production Performance Measurement
From the ”OEE Industry standard”



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Production Performance Measurement - OEE

$$\text{OEEa (\%)} = \frac{\text{Utilized time} - \text{stoppage time}}{\text{Utilized time}}$$

$$\text{OEEq (\%)} = \frac{\text{No. of approved products produced in net production time}}{\text{Total no. of produced products}}$$

OEEq Notes:

OEEq (quality) are expressing lost time in net production due to production of non conforming articles

OEEq: Rejects inside the “stoppage windows” should not have an effect on OEEq (example: set-up scrap when the machine are reported as stopped due to set-ups)

Production Performance Measurement - OEE

$$\text{OEEp (\%)} = \frac{\text{Actual output (performance)}}{\text{Standard output}}$$

OEEp Notes:

Performance loss = (standard output – actual output):

- Speed loss due to gap in cycle time
- Minor stoppages (machine stops < 5 minutes and non recordable stoppages)
- Small adjustments (machine still running)
- Cycle variations during shift

Standard output:

- Standard cycle time values from MRP-system should be used
- Actual values should be controlled and documented against standard values

Target: close gaps between agreed best possible standard values and actual values,- representing “low hanging” loss on performance

Production Performance Measurement - OEE

Total Hours (calendar h) - **Weekend, holiday** (& time not yet passed in current month) = **Installed capacity = Planned operating time**

Installed capacity = Planned operating time - **No orders and other planned stoppages** = **Utilized time = Planned prod time** (Installed capacity – planned stoppages)

Machine	TOTAL HOURS	WEEKEND, HOLIDAY	PLANNED OPERATING TIME	Planned stop (sum)	PLANNED STOP: Start / stop	Tellimus puudub	Seadistaja ootamine	Vormivahetus /värvivahetus	Inim. puudus	Katsetus	Planned prduction time	Stoppage time	Net production time	Cycle loss	Minor stoppages, adjusts	Actual production	Quality loss moulding	Quality loss assy+fc	Approved production	Capacity utilization	OEE TOTAL: OEEa	OEEp	OEEq	OEE	Machine usage
		TOTAL HOURS IN PERIOD	PLANNED OPERATING TIME (Installed capacity)								PLANNED PRODUCTION TIME (Utilized time)			NET PRODUCTION TIME			ACTUAL PRODUCTION			PI (Production Index)					
				PLANNED STOP																					
			Capacity Utilization									OEEa		OEEp			OEEq								
2	720	264,0	456,0	166,0	1,5	144,0	13,0	7,5			290,0	47,0	243,0	3,0	1,8	238,2	3,0	0,0	235,2	64%	84%	98%	99%	81%	
3	720	264,0	456,0	331,3	2,5	8,0			320,8		124,8	0,0	124,8	0,0	-4,6	129,3	0,3	0,0	129,0	27%	100%	104%	100%	103%	
4	720	264,0	456,0	74,8	16,0	8,0	19,3	15,0	16,5		381,3	97,0	284,3	-1,0	-1,8	287,0	7,8	0,0	279,3	84%	75%	101%	97%	73%	
5	720	264,0	456,0	140,3	3,0	96,0	30,0	8,8	2,5		315,8	43,5	272,3	9,1	8,0	255,1	10,9	0,0	244,2	69%	86%	94%	96%	77%	
6	720	272,0	448,0	149,0	4,0	72,0	25,8	15,3	32,0		299,0	106,8	192,3	9,0	4,3	178,9	1,1	0,0	177,8	67%	64%	93%	99%	59%	
7	720	264,0	456,0	318,0	6,0	252,5	24,0	11,0	16,0	8,5	138,0	20,8	117,3	-0,4	0,1	117,5	1,8	0,0	115,7	30%	85%	100%	98%	84%	
8	720	264,0	456,0	183,3	4,3	128,0	19,5	15,5	16,0		272,8	101,0	171,8	-11,6	-7,1	190,5	1,1	0,0	189,4	60%	63%	111%	99%	69%	
9	720	272,0	448,0	291,0		216,0	64,3	10,8			157,0	30,8	126,3	3,6	2,5	120,2	0,5	0,0	119,7	35%	80%	95%	100%	76%	
10	720	272,0	448,0	278,3	5,5	216,0	32,8	4,0	16,0	4,0	169,8	47,3	122,5	14,5	-13,3	121,3	0,1	0,0	121,2	38%	72%	99%	100%	71%	
12	720	272,0	448,0	168,8	2,0	104,0	37,5	25,3			279,3	55,5	223,8	7,1	-1,3	217,9	0,3	0,0	217,6	62%	80%	97%	100%	78%	
13	720	272,0	448,0	360,8	11,8				349,0		87,3	0,0	87,3	0,5	3,8	83,0	0,0	0,0	83,0	19%	100%	95%	100%	95%	
14	720	264,0	456,0	134,3	5,8	48,0	27,0	27,8	9,8	16,0	321,8	40,5	281,3	-24,1	0,5	304,8	20,5	0,0	284,3	71%	87%	108%	93%	88%	
15	720	272,0	448,0	190,8	2,3	160,0	23,5	5,0			257,3	14,3	243,0	-8,8	1,4	250,4	3,2	0,0	247,2	57%	94%	103%	99%	96%	
16	720	264,0	456,0	378,5	6,0	267,0	50,8	26,8	28,0		77,5	33,3	44,3	0,0	-0,7	45,0	1,0	0,0	44,0	17%	57%	102%	98%	57%	
17	720	264,0	456,0	241,5	13,5	56,0	33,0	14,3	124,8		214,5	18,5	196,0	-2,6	-2,4	201,1	0,0	0,0	201,1	47%	91%	103%	100%	94%	
18	720	264,0	456,0	337,0	5,0	256,0	34,0	18,0	24,0		119,0	44,8	74,3	0,3	1,1	72,8	0,9	0,0	71,9	26%	62%	98%	99%	60%	
20	720	264,0	456,0	24,8	2,5	8,0	7,3	7,0			431,3	64,0	367,3	-8,2	0,7	374,7	3,7	0,0	370,9	95%	85%	102%	99%	86%	
21	720	264,0	456,0	84,0	6,0	16,0	31,8	21,3	9,0		372,0	13,8	358,3	8,2	8,0	342,1	16,6	0,0	325,5	82%	96%	95%	95%	87%	
22	720	264,0	456,0	339,8	6,8				333,0		116,3	1,8	114,5	0,0	1,6	112,9	0,0	0,0	112,9	25%	98%	99%	100%	97%	
23	720	264,0	456,0	82,5	2,0	24,0	33,5	23,0			373,5	74,8	298,8	9,9	6,0	282,9	13,1	0,0	269,8	82%	80%	95%	95%	72%	
24	720	264,0	456,0	43,5	9,8	8,0	15,8	10,0			412,5	95,0	317,5	3,2	3,4	310,9	18,5	0,0	292,4	90%	77%	98%	94%	71%	
25	720	264,0	456,0	40,8	4,3	8,0	19,0	8,5	1,0		415,3	67,5	347,8	5,3	-7,4	349,8	15,7	0,0	334,1	91%	84%	101%	95%	80%	
26	720	256,0	464,0	208,8	7,5	158,0	17,8	25,5			255,3	30,3	225,0	21,4	0,4	203,2	4,1	0,0	199,1	55%	88%	90%	98%	78%	
27	720	264,0	456,0	135,8	10,5	104,0	8,0	13,3			320,3	13,0	307,3	2,7	3,6	300,9	5,4	0,0	295,6	70%	96%	98%	98%	92%	
28	720	264,0	456,0	164,3	117,3	40,0	2,0	5,0			291,8	157,5	134,3	3,4	-1,0	131,8	11,4	0,0	120,4	64%	46%	98%	91%	41%	
29	720	264,0	456,0	218,0	2,5	120,0	51,0	12,5	32,0		238,0	22,0	216,0	2,5	4,1	209,4	3,1	0,0	206,3	52%	91%	97%	99%	87%	
30	720	264,0	456,0	188,5	14,8	112,0	45,0	16,8			267,5	40,5	227,0	4,9	0,3	221,8	1,1	0,0	220,7	59%	85%	98%	99%	83%	
33	720	272,0	448,0	267,0	16,0	204,0	34,0	5,0	8,0		181,0	90,0	91,0	2,0	-0,3	89,3	0,0	0,0	89,3	40%	50%	98%	100%	49%	
			12720	5541	289	2834	699	353	1338	29	7179	1371	5809	54	12	5743	145	0	5598	56,4%	80,9%	98,9%	97,5%	78,0%	

Holidays, weekends, time not yet passed in current month

Installed capacity

No orders and other planned stoppages

Utilized time

Stoppage time

Net production availability

Planned cycle vs reported, cycle variation and reporting errors

Production hours for all produced parts

Production time for scrap

Production hours for OK parts

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Production Performance Measurement - OEE

Utilized time = Planned production time - **Reported stoppage time** = **Net production time** (utilized time – stopages)

Net production time - **Cycle loss** - **Minor stoppages, adjusts** = **Actual production** (OK + NOT OK products)

Machine	TOTAL HOURS	WEEKEND, HOLIDAY	PLANNED OPERATING TIME	Planned stop (sum)	PLANNED STOP: Start / stop	PLANNED STOP: Tellimus puudub	PLANNED STOP: Seadistaja ootamine	PLANNED STOP: Vormivahetus /värvivahetus	PLANNED STOP: Inim. puudus	PLANNED STOP: Katsetus	Planned prduction time	Stoppage time	Net production time	Cycle loss	Minor stoppages, adjusts	Actual production	Quality loss moulding	Quality loss assy+fc	Approved production	Capacity utilization	PI (Production Index): OEE TOTAL: OEEa	OEEp	OEEq	OEE	Machine usage
			Capacity Utilization									OEEa			OEEp				OEEq						
2	720	264,0	456,0	166,0	1,5	144,0	13,0	7,5			290,0	47,0	243,0	3,0	1,8	238,2	3,0	0,0	235,2	64%	84%	98%	99%	81%	
3	720	264,0	456,0	331,3	2,5	8,0			320,8		124,8	0,0	124,8	0,0	-4,6	129,3	0,3	0,0	129,0	27%	100%	104%	100%	103%	
4	720	264,0	456,0	74,8	16,0	8,0	19,3	15,0	16,5		381,3	97,0	284,3	-1,0	-1,8	287,0	7,8	0,0	279,3	84%	75%	101%	97%	73%	
5	720	264,0	456,0	140,3	3,0	96,0	30,0	8,8	2,5		315,8	43,5	272,3	9,1	8,0	255,1	10,9	0,0	244,2	69%	86%	94%	96%	77%	
6	720	272,0	448,0	149,0	4,0	72,0	25,8	15,3	32,0		299,0	106,8	192,3	9,0	4,3	178,9	1,1	0,0	177,8	67%	64%	93%	99%	59%	
7	720	264,0	456,0	318,0	6,0	252,5	24,0	11,0	16,0	8,5	138,0	20,8	117,3	-0,4	0,1	117,5	1,8	0,0	115,7	30%	85%	100%	98%	84%	
8	720	264,0	456,0	183,3	4,3	128,0	19,5	15,5	16,0		272,8	101,0	171,8	-11,6	-7,1	190,5	1,1	0,0	189,4	60%	63%	111%	99%	69%	
9	720	272,0	448,0	291,0		216,0	64,3	10,8			157,0	30,8	126,3	3,6	2,5	120,2	0,5	0,0	119,7	35%	80%	95%	100%	76%	
10	720	272,0	448,0	278,3	5,5	216,0	32,8	4,0	16,0	4,0	169,8	47,3	122,5	14,5	-13,3	121,3	0,1	0,0	121,2	38%	72%	99%	100%	71%	
12	720	272,0	448,0	168,8	2,0	104,0	37,5	25,3			279,3	55,5	223,8	7,1	-1,3	217,9	0,3	0,0	217,6	62%	80%	97%	100%	78%	
13	720	272,0	448,0	360,8	11,8				349,0		87,3	0,0	87,3	0,5	3,8	83,0	0,0	0,0	83,0	19%	100%	95%	100%	95%	
14	720	264,0	456,0	134,3	5,8	48,0	27,0	27,8	9,8	16,0	321,8	40,5	281,3	-24,1	0,5	304,8	20,5	0,0	284,3	71%	87%	108%	93%	88%	
15	720	272,0	448,0	190,8	2,3	160,0	23,5	5,0			257,3	14,3	243,0	-8,8	1,4	250,4	3,2	0,0	247,2	57%	94%	103%	99%	96%	
16	720	264,0	456,0	378,5	6,0	267,0	50,8	26,8	28,0		77,5	33,3	44,3	0,0	-0,7	45,0	1,0	0,0	44,0	17%	57%	102%	98%	57%	
17	720	264,0	456,0	241,5	13,5	56,0	33,0	14,3	124,8		214,5	18,5	196,0	-2,6	-2,4	201,1	0,0	0,0	201,1	47%	91%	103%	100%	94%	
18	720	264,0	456,0	337,0	5,0	256,0	34,0	18,0	24,0		119,0	44,8	74,3	0,3	1,1	72,8	0,9	0,0	71,9	26%	62%	98%	99%	60%	
20	720	264,0	456,0	24,8	2,5	8,0	7,3	7,0			431,3	64,0	367,3	-8,2	0,7	374,7	3,7	0,0	370,9	95%	85%	102%	99%	86%	
21	720	264,0	456,0	84,0	6,0	16,0	31,8	21,3	9,0		372,0	13,8	358,3	8,2	8,0	342,1	16,6	0,0	325,5	82%	96%	95%	95%	87%	
22	720	264,0	456,0	339,8	6,8				333,0		116,3	1,8	114,5	0,0	1,6	112,9	0,0	0,0	112,9	25%	98%	99%	100%	97%	
23	720	264,0	456,0	82,5	2,0	24,0	33,5	23,0			373,5	74,8	298,8	9,9	6,0	282,9	13,1	0,0	269,8	82%	80%	95%	95%	72%	
24	720	264,0	456,0	43,5	9,8	8,0	15,8	10,0			412,5	95,0	317,5	3,2	3,4	310,9	18,5	0,0	292,4	90%	77%	98%	94%	71%	
25	720	264,0	456,0	40,8	4,3	8,0	19,0	8,5	1,0		415,3	67,5	347,8	5,3	-7,4	349,8	15,7	0,0	334,1	91%	84%	101%	95%	80%	
26	720	256,0	464,0	208,8	7,5	158,0	17,8	25,5			255,3	30,3	225,0	21,4	0,4	203,2	4,1	0,0	199,1	55%	88%	90%	98%	78%	
27	720	264,0	456,0	135,8	10,5	104,0	8,0	13,3			320,3	13,0	307,3	2,7	3,6	300,9	5,4	0,0	295,6	70%	96%	98%	98%	92%	
28	720	264,0	456,0	164,3	117,3	40,0	2,0	5,0			291,8	157,5	134,3	3,4	-1,0	131,8	11,4	0,0	120,4	64%	46%	98%	91%	41%	
29	720	264,0	456,0	218,0	2,5	120,0	51,0	12,5	32,0		238,0	22,0	216,0	2,5	4,1	209,4	3,1	0,0	206,3	52%	91%	97%	99%	87%	
30	720	264,0	456,0	188,5	14,8	112,0	45,0	16,8			267,5	40,5	227,0	4,9	0,3	221,8	1,1	0,0	220,7	59%	85%	98%	99%	83%	
33	720	272,0	448,0	267,0	16,0	204,0	34,0	5,0	8,0		181,0	90,0	91,0	2,0	-0,3	89,3	0,0	0,0	89,3	40%	50%	98%	100%	49%	
			12720	5541	289	2834	699	353	1338	29	7179	1371	5809	54	12	5743	145	0	5598	56,4%	80,9%	98,9%	97,5%	78,0%	

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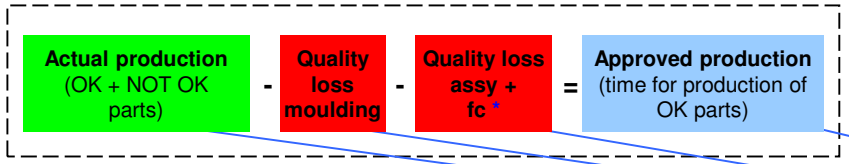
Production Performance Measurement - OEE



Machine	TOTAL HOURS	WEEKEND, HOLIDAY	PLANNED OPERATING TIME	Planned stop (sum)	PLANNED STOP: Start / stop	PLANNED STOP: Tellimus puudub	PLANNED STOP: Seadistaja ootamine	PLANNED STOP: Vormivahetus /värvivahetus	PLANNED STOP: Inim. puudus	PLANNED STOP: Katsetus	Planned prduction time	Stoppage time	Net production time	Cycle loss	Minor stoppages, adjusts	Actual production	Quality loss moulding	Quality loss assy+fc	Approved production	Capacity utilization	PI (Production Index): OEE TOTAL: OEEa	OEEp	OEEq	OEE	Machine usage
			Capacity Utilization									OEEa			OEEp				OEEq						
2	720	264,0	456,0	166,0	1,5	144,0	13,0	7,5			290,0	47,0	243,0	3,0	1,8	238,2	3,0	0,0	235,2	64%	84%	98%	99%	81%	
3	720	264,0	456,0	331,3	2,5	8,0			320,8		124,8	0,0	124,8	0,0	-4,6	129,3	0,3	0,0	129,0	27%	100%	104%	100%	103%	
4	720	264,0	456,0	74,8	16,0	8,0	19,3	15,0	16,5		381,3	97,0	284,3	-1,0	-1,8	287,0	7,8	0,0	279,3	84%	75%	101%	97%	73%	
5	720	264,0	456,0	140,3	3,0	96,0	30,0	8,8	2,5		315,8	43,5	272,3	9,1	8,0	255,1	10,9	0,0	244,2	69%	86%	94%	96%	77%	
6	720	272,0	448,0	149,0	4,0	72,0	25,8	15,3	32,0		299,0	106,8	192,3	9,0	4,3	178,9	1,1	0,0	177,8	67%	64%	93%	99%	59%	
7	720	264,0	456,0	318,0	6,0	252,5	24,0	11,0	16,0	8,5	138,0	20,8	117,3	-0,4	0,1	117,5	1,8	0,0	115,7	30%	85%	100%	98%	84%	
8	720	264,0	456,0	183,3	4,3	128,0	19,5	15,5	16,0		272,8	101,0	171,8	-11,6	-7,1	190,5	1,1	0,0	189,4	60%	63%	111%	99%	69%	
9	720	272,0	448,0	291,0		216,0	64,3	10,8			157,0	30,8	126,3	3,6	2,5	120,2	0,5	0,0	119,7	35%	80%	95%	100%	76%	
10	720	272,0	448,0	278,3	5,5	216,0	32,8	4,0	16,0	4,0	169,8	47,3	122,5	14,5	-13,3	121,3	0,1	0,0	121,2	38%	72%	99%	100%	71%	
12	720	272,0	448,0	168,8	2,0	104,0	37,5	25,3			279,3	55,5	223,8	7,1	-1,3	217,9	0,3	0,0	217,6	62%	80%	97%	100%	78%	
13	720	272,0	448,0	360,8	11,8				349,0		87,3	0,0	87,3	0,5	3,8	83,0	0,0	0,0	83,0	19%	100%	95%	100%	95%	
14	720	264,0	456,0	134,3	5,8	48,0	27,0	27,8	9,8	16,0	321,8	40,5	281,3	-24,1	0,5	304,8	20,5	0,0	284,3	71%	87%	108%	93%	88%	
15	720	272,0	448,0	190,8	2,3	160,0	23,5	5,0			257,3	14,3	243,0	-8,8	1,4	250,4	3,2	0,0	247,2	57%	94%	103%	99%	96%	
16	720	264,0	456,0	378,5	6,0	267,0	50,8	26,8	28,0		77,5	33,3	44,3	0,0	-0,7	45,0	1,0	0,0	44,0	17%	57%	102%	98%	57%	
17	720	264,0	456,0	241,5	13,5	56,0	33,0	14,3	124,8		214,5	18,5	196,0	-2,6	-2,4	201,1	0,0	0,0	201,1	47%	91%	103%	100%	94%	
18	720	264,0	456,0	337,0	5,0	256,0	34,0	18,0	24,0		119,0	44,8	74,3	0,3	1,1	72,8	0,9	0,0	71,9	26%	62%	98%	99%	60%	
20	720	264,0	456,0	24,8	2,5	8,0	7,3	7,0			431,3	64,0	367,3	-8,2	0,7	374,7	3,7	0,0	370,9	95%	85%	102%	99%	86%	
21	720	264,0	456,0	84,0	6,0	16,0	31,8	21,3	9,0		372,0	13,8	358,3	8,2	8,0	342,1	16,6	0,0	325,5	82%	96%	95%	95%	87%	
22	720	264,0	456,0	339,8	6,8				333,0		116,3	1,8	114,5	0,0	1,6	112,9	0,0	0,0	112,9	25%	98%	99%	100%	97%	
23	720	264,0	456,0	82,5	2,0	24,0	33,5	23,0			373,5	74,8	298,8	9,9	6,0	282,9	13,1	0,0	269,8	82%	80%	95%	95%	72%	
24	720	264,0	456,0	43,5	9,8	8,0	15,8	10,0			412,5	95,0	317,5	3,2	3,4	310,9	18,5	0,0	292,4	90%	77%	98%	94%	71%	
25	720	264,0	456,0	40,8	4,3	8,0	19,0	8,5	1,0		415,3	67,5	347,8	5,3	-7,4	349,8	15,7	0,0	334,1	91%	84%	101%	95%	80%	
26	720	256,0	464,0	208,8	7,5	158,0	17,8	25,5			255,3	30,3	225,0	21,4	0,4	203,2	4,1	0,0	199,1	55%	88%	90%	98%	78%	
27	720	264,0	456,0	135,8	10,5	104,0	8,0	13,3			320,3	13,0	307,3	2,7	3,6	300,9	5,4	0,0	295,6	70%	96%	98%	98%	92%	
28	720	264,0	456,0	164,3	117,3	40,0	2,0	5,0			291,8	157,5	134,3	3,4	-1,0	131,8	11,4	0,0	120,4	64%	46%	98%	91%	41%	
29	720	264,0	456,0	218,0	2,5	120,0	51,0	12,5	32,0		238,0	22,0	216,0	2,5	4,1	209,4	3,1	0,0	206,3	52%	91%	97%	99%	87%	
30	720	264,0	456,0	188,5	14,8	112,0	45,0	16,8			267,5	40,5	227,0	4,9	0,3	221,8	1,1	0,0	220,7	59%	85%	98%	99%	83%	
33	720	272,0	448,0	267,0	16,0	204,0	34,0	5,0	8,0		181,0	90,0	91,0	2,0	-0,3	89,3	0,0	0,0	89,3	40%	50%	98%	100%	49%	
			12720	5541	289	2834	699	353	1338	29	7179	1371	5809	54	12	5743	145	0	5598	56,4%	80,9%	98,9%	97,5%	78,0%	

*) Assy + final control findings are divided proportionally to respective machines that have produced the found nonconforming products.

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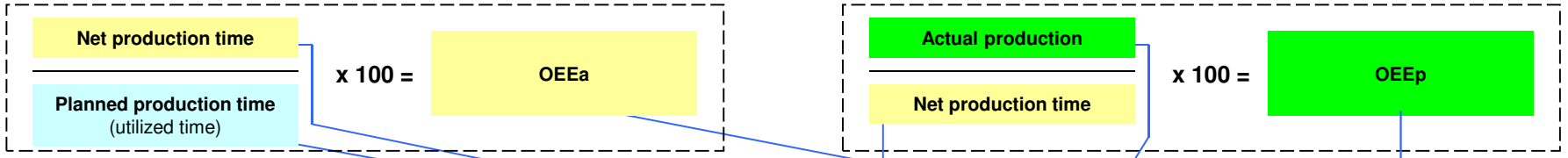
Production Performance Measurement - OEE



Machine	TOTAL HOURS	WEEKEND, HOLIDAY	PLANNED OPERATING TIME	Planned stop (sum)	PLANNED STOP: Start / stop	Tellimus puudub	Seadistaja ootamine	Vormivahetus /värvivahetus	Inim. puudus	Katsetus	Planned prduction time	Stoppage time	Net production time	Cycle loss	Minor stoppages, adjusts	Actual production	Quality loss moulding	Quality loss assy+fc	Approved production	Capacity utilization	OEE TOTAL: OEEa	OEEp	OEEq	OEE	Machine usage
			Capacity Utilization									OEEa			OEEp					PI (Production Index)					
2	720	264,0	456,0	166,0	1,5	144,0	13,0	7,5			290,0	47,0	243,0	3,0	1,8	238,2	3,0	0,0	235,2	64%	84%	98%	99%	81%	
3	720	264,0	456,0	331,3	2,5	8,0			320,8		124,8	0,0	124,8	0,0	-4,6	129,3	0,3	0,0	129,0	27%	100%	104%	100%	103%	
4	720	264,0	456,0	74,8	16,0	8,0	19,3	15,0	16,5		381,3	97,0	284,3	-1,0	-1,8	287,0	7,8	0,0	279,3	84%	75%	101%	97%	73%	
5	720	264,0	456,0	140,3	3,0	96,0	30,0	8,8	2,5		315,8	43,5	272,3	9,1	8,0	255,1	10,9	0,0	244,2	69%	86%	94%	96%	77%	
6	720	272,0	448,0	149,0	4,0	72,0	25,8	15,3	32,0		299,0	106,8	192,3	9,0	4,3	178,9	1,1	0,0	177,8	67%	64%	93%	99%	59%	
7	720	264,0	456,0	318,0	6,0	252,5	24,0	11,0	16,0	8,5	138,0	20,8	117,3	-0,4	0,1	117,5	1,8	0,0	115,7	30%	85%	100%	98%	84%	
8	720	264,0	456,0	183,3	4,3	128,0	19,5	15,5	16,0		272,8	101,0	171,8	-11,6	-7,1	190,5	1,1	0,0	189,4	60%	63%	111%	99%	69%	
9	720	272,0	448,0	291,0		216,0	64,3	10,8			157,0	30,8	126,3	3,6	2,5	120,2	0,5	0,0	119,7	35%	80%	95%	100%	76%	
10	720	272,0	448,0	278,3	5,5	216,0	32,8	4,0	16,0	4,0	169,8	47,3	122,5	14,5	-13,3	121,3	0,1	0,0	121,2	38%	72%	99%	100%	71%	
12	720	272,0	448,0	168,8	2,0	104,0	37,5	25,3			279,3	55,5	223,8	7,1	-1,3	217,9	0,3	0,0	217,6	62%	80%	97%	100%	78%	
13	720	272,0	448,0	360,8	11,8				349,0		87,3	0,0	87,3	0,5	3,8	83,0	0,0	0,0	83,0	19%	100%	95%	100%	95%	
14	720	264,0	456,0	134,3	5,8	48,0	27,0	27,8	9,8	16,0	321,8	40,5	281,3	-24,1	0,5	304,8	20,5	0,0	284,3	71%	87%	108%	93%	88%	
15	720	272,0	448,0	190,8	2,3	160,0	23,5	5,0			257,3	14,3	243,0	-8,8	1,4	250,4	3,2	0,0	247,2	57%	94%	103%	99%	96%	
16	720	264,0	456,0	378,5	6,0	267,0	50,8	26,8	28,0		77,5	33,3	44,3	0,0	-0,7	45,0	1,0	0,0	44,0	17%	57%	102%	98%	57%	
17	720	264,0	456,0	241,5	13,5	56,0	33,0	14,3	124,8		214,5	18,5	196,0	-2,6	-2,4	201,1	0,0	0,0	201,1	47%	91%	103%	100%	94%	
18	720	264,0	456,0	337,0	5,0	256,0	34,0	18,0	24,0		119,0	44,8	74,3	0,3	1,1	72,8	0,9	0,0	71,9	26%	62%	98%	99%	60%	
20	720	264,0	456,0	24,8	2,5	8,0	7,3	7,0			431,3	64,0	367,3	-8,2	0,7	374,7	3,7	0,0	370,9	95%	85%	102%	99%	86%	
21	720	264,0	456,0	84,0	6,0	16,0	31,8	21,3	9,0		372,0	13,8	358,3	8,2	8,0	342,1	16,6	0,0	325,5	82%	96%	95%	95%	87%	
22	720	264,0	456,0	339,8	6,8				333,0		116,3	1,8	114,5	0,0	1,6	112,9	0,0	0,0	112,9	25%	98%	99%	100%	97%	
23	720	264,0	456,0	82,5	2,0	24,0	33,5	23,0			373,5	74,8	298,8	9,9	6,0	282,9	13,1	0,0	269,8	82%	80%	95%	95%	72%	
24	720	264,0	456,0	43,5	9,8	8,0	15,8	10,0			412,5	95,0	317,5	3,2	3,4	310,9	18,5	0,0	292,4	90%	77%	98%	94%	71%	
25	720	264,0	456,0	40,8	4,3	8,0	19,0	8,5	1,0		415,3	67,5	347,8	5,3	-7,4	349,8	15,7	0,0	334,1	91%	84%	101%	95%	80%	
26	720	256,0	464,0	208,8	7,5	158,0	17,8	25,5			255,3	30,3	225,0	21,4	0,4	203,2	4,1	0,0	199,1	55%	88%	90%	98%	78%	
27	720	264,0	456,0	135,8	10,5	104,0	8,0	13,3			320,3	13,0	307,3	2,7	3,6	300,9	5,4	0,0	295,6	70%	96%	98%	98%	92%	
28	720	264,0	456,0	164,3	117,3	40,0	2,0	5,0			291,8	157,5	134,3	3,4	-1,0	131,8	11,4	0,0	120,4	64%	46%	98%	91%	41%	
29	720	264,0	456,0	218,0	2,5	120,0	51,0	12,5	32,0		238,0	22,0	216,0	2,5	4,1	209,4	3,1	0,0	206,3	52%	91%	97%	99%	87%	
30	720	264,0	456,0	188,5	14,8	112,0	45,0	16,8			267,5	40,5	227,0	4,9	0,3	221,8	1,1	0,0	220,7	59%	85%	98%	99%	83%	
33	720	272,0	448,0	267,0	16,0	204,0	34,0	5,0	8,0		181,0	90,0	91,0	2,0	-0,3	89,3	0,0	0,0	89,3	40%	50%	98%	100%	49%	
			12720	5541	289	2834	699	353	1338	29	7179	1371	5809	54	12	5743	145	0	5598	56,4%	80,9%	98,9%	97,5%	78,0%	

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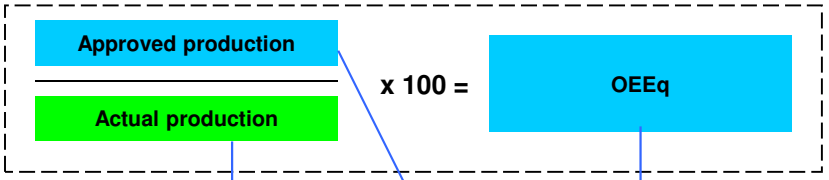
Production Performance Measurement - OEE



Machine	TOTAL HOURS	WEEKEND, HOLIDAY	PLANNED OPERATING TIME	Planned stop (sum)	PLANNED STOP					Planned prduction time	PLANNED PRODUCTION TIME (Utilized time)		NET PRODUCTION TIME			ACTUAL PRODUCTION			PI (Production Index)	OEE TOTAL				Machine usage
					Start / stop	Tellimus puudub	Seadistaja ootamine	Vormivahetus /värvivahetus	Inim. puudus	Katsetus		Stoppage time	Net production time	Cycle loss	Minor stoppages, adjusts	Actual production	Quality loss moulding	Quality loss assy+fc	Approved production	Capacity utilization	OEEa	OEEp	OEEq	OEE	
	TOTAL HOURS IN PERIOD		PLANNED OPERATING TIME (Installed capacity)																				
			Capacity Utilization								OEEa		OEEp			OEEq								
2	720	264,0	456,0	166,0	1,5	144,0	13,0	7,5			290,0	47,0	243,0	3,0	1,8	238,2	3,0	0,0	235,2	64%	84%	98%	99%	81%	
3	720	264,0	456,0	331,3	2,5	8,0			320,8		124,8	0,0	124,8	0,0	-4,6	129,3	0,3	0,0	129,0	27%	100%	104%	100%	103%	
4	720	264,0	456,0	74,8	16,0	8,0	19,3	15,0	16,5		381,3	97,0	284,3	-1,0	-1,8	287,0	7,8	0,0	279,3	84%	75%	101%	97%	73%	
5	720	264,0	456,0	140,3	3,0	96,0	30,0	8,8	2,5		315,8	43,5	272,3	9,1	8,0	255,1	10,9	0,0	244,2	69%	86%	94%	96%	77%	
6	720	272,0	448,0	149,0	4,0	72,0	25,8	15,3	32,0		299,0	106,8	192,3	9,0	4,3	178,9	1,1	0,0	177,8	67%	64%	93%	99%	59%	
7	720	264,0	456,0	318,0	6,0	252,5	24,0	11,0	16,0	8,5	138,0	20,8	117,3	-0,4	0,1	117,5	1,8	0,0	115,7	30%	85%	100%	98%	84%	
8	720	264,0	456,0	183,3	4,3	128,0	19,5	15,5	16,0		272,8	101,0	171,8	-11,6	-7,1	190,5	1,1	0,0	189,4	60%	63%	111%	99%	69%	
9	720	272,0	448,0	291,0		216,0	64,3	10,8			157,0	30,8	126,3	3,6	2,5	120,2	0,5	0,0	119,7	35%	80%	95%	100%	76%	
10	720	272,0	448,0	278,3	5,5	216,0	32,8	4,0	16,0	4,0	169,8	47,3	122,5	14,5	-13,3	121,3	0,1	0,0	121,2	38%	72%	99%	100%	71%	
12	720	272,0	448,0	168,8	2,0	104,0	37,5	25,3			279,3	55,5	223,8	7,1	-1,3	217,9	0,3	0,0	217,6	62%	80%	97%	100%	78%	
13	720	272,0	448,0	360,8	11,8				349,0		87,3	0,0	87,3	0,5	3,8	83,0	0,0	0,0	83,0	19%	100%	95%	100%	95%	
14	720	264,0	456,0	134,3	5,8	48,0	27,0	27,8	9,8	16,0	321,8	40,5	281,3	-24,1	0,5	304,8	20,5	0,0	284,3	71%	87%	108%	93%	88%	
15	720	272,0	448,0	190,8	2,3	160,0	23,5	5,0			257,3	14,3	243,0	-8,8	1,4	250,4	3,2	0,0	247,2	57%	94%	103%	99%	96%	
16	720	264,0	456,0	378,5	6,0	267,0	50,8	26,8	28,0		77,5	33,3	44,3	0,0	-0,7	45,0	1,0	0,0	44,0	17%	57%	102%	98%	57%	
17	720	264,0	456,0	241,5	13,5	56,0	33,0	14,3	124,8		214,5	18,5	196,0	-2,6	-2,4	201,1	0,0	0,0	201,1	47%	91%	103%	100%	94%	
18	720	264,0	456,0	337,0	5,0	256,0	34,0	18,0	24,0		119,0	44,8	74,3	0,3	1,1	72,8	0,9	0,0	71,9	26%	62%	98%	99%	60%	
20	720	264,0	456,0	24,8	2,5	8,0	7,3	7,0			431,3	64,0	367,3	-8,2	0,7	374,7	3,7	0,0	370,9	95%	85%	102%	99%	86%	
21	720	264,0	456,0	84,0	6,0	16,0	31,8	21,3	9,0		372,0	13,8	358,3	8,2	8,0	342,1	16,6	0,0	325,5	82%	96%	95%	95%	87%	
22	720	264,0	456,0	339,8	6,8				333,0		116,3	1,8	114,5	0,0	1,6	112,9	0,0	0,0	112,9	25%	98%	99%	100%	97%	
23	720	264,0	456,0	82,5	2,0	24,0	33,5	23,0			373,5	74,8	298,8	9,9	6,0	282,9	13,1	0,0	269,8	82%	80%	95%	95%	72%	
24	720	264,0	456,0	43,5	9,8	8,0	15,8	10,0			412,5	95,0	317,5	3,2	3,4	310,9	18,5	0,0	292,4	90%	77%	98%	94%	71%	
25	720	264,0	456,0	40,8	4,3	8,0	19,0	8,5	1,0		415,3	67,5	347,8	5,3	-7,4	349,8	15,7	0,0	334,1	91%	84%	101%	95%	80%	
26	720	256,0	464,0	208,8	7,5	158,0	17,8	25,5			255,3	30,3	225,0	21,4	0,4	203,2	4,1	0,0	199,1	55%	88%	90%	98%	78%	
27	720	264,0	456,0	135,8	10,5	104,0	8,0	13,3			320,3	13,0	307,3	2,7	3,6	300,9	5,4	0,0	295,6	70%	96%	98%	98%	92%	
28	720	264,0	456,0	164,3	117,3	40,0	2,0	5,0			291,8	157,5	134,3	3,4	-1,0	131,8	11,4	0,0	120,4	64%	46%	98%	91%	41%	
29	720	264,0	456,0	218,0	2,5	120,0	51,0	12,5	32,0		238,0	22,0	216,0	2,5	4,1	209,4	3,1	0,0	206,3	52%	91%	97%	99%	87%	
30	720	264,0	456,0	188,5	14,8	112,0	45,0	16,8			267,5	40,5	227,0	4,9	0,3	221,8	1,1	0,0	220,7	59%	85%	98%	99%	83%	
33	720	272,0	448,0	267,0	16,0	204,0	34,0	5,0	8,0		181,0	90,0	91,0	2,0	-0,3	89,3	0,0	0,0	89,3	40%	50%	98%	100%	49%	
			12720	5541	289	2834	699	353	1338	29	7179	1371	5809	54	12	5743	145	0	5598	56,4%	80,9%	98,9%	97,5%	78,0%	

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Production Performance Measurement - OEE

Planned production time / **Planned operating time** x 100 = **Capacity utilization** (Planned production time / Planned operating time)

OEEp = Actual production / Net production time x **OEEp** = Net production time / Planned production time x **OEEq** = Approved production / Actual production = **OEE** (OEEa x OEEp x OEEq)

Machine	TOTAL HOURS	WEEKEND, HOLIDAY	PLANNED OPERATING TIME	Planned stop (sum)	PLANNED STOP: Start / stop	Tellimus puudub	Seadistaja ootamine	Vormivahetus /värvivahetus	Inim. puudus	Katsetus	Planned prduction time	Stoppage time	Net production time	Cycle loss	Minor stoppages, adjusts	Actual production	Quality loss moulding	Quality loss assy+fc	Approved production	Capacity utilization	OEE TOTAL: OEEa	OEEp	OEEq	OEE	Machine usage
			Capacity Utilization									OEEa			OEEp				OEEq						
2	720	264,0	456,0	166,0	1,5	144,0	13,0	7,5			290,0	47,0	243,0	3,0	1,8	238,2	3,0	0,0	235,2	64%	84%	98%	99%	81%	
3	720	264,0	456,0	331,3	2,5	8,0			320,8		124,8	0,0	124,8	0,0	-4,6	129,3	0,3	0,0	129,0	27%	100%	104%	100%	103%	
4	720	264,0	456,0	74,8	16,0	8,0	19,3	15,0	16,5		381,3	97,0	284,3	-1,0	-1,8	287,0	7,8	0,0	279,3	84%	75%	101%	97%	73%	
5	720	264,0	456,0	140,3	3,0	96,0	30,0	8,8	2,5		315,8	43,5	272,3	9,1	8,0	255,1	10,9	0,0	244,2	69%	86%	94%	96%	77%	
6	720	272,0	448,0	149,0	4,0	72,0	25,8	15,3	32,0		299,0	106,8	192,3	9,0	4,3	178,9	1,1	0,0	177,8	67%	64%	93%	99%	59%	
7	720	264,0	456,0	318,0	6,0	252,5	24,0	11,0	16,0	8,5	138,0	20,8	117,3	-0,4	0,1	117,5	1,8	0,0	115,7	30%	88%	100%	98%	84%	
8	720	264,0	456,0	183,3	4,3	128,0	19,5	15,5	16,0		272,8	101,0	171,8	-11,6	-7,1	190,5	1,1	0,0	189,4	60%	63%	111%	99%	69%	
9	720	272,0	448,0	291,0		216,0	64,3	10,8			157,0	30,8	126,3	3,6	2,5	120,2	0,5	0,0	119,7	35%	80%	95%	100%	76%	
10	720	272,0	448,0	278,3	5,5	216,0	32,8	4,0	16,0	4,0	169,8	47,3	122,5	14,5	-13,3	121,3	0,1	0,0	121,2	38%	72%	99%	100%	71%	
12	720	272,0	448,0	168,8	2,0	104,0	37,5	25,3			279,3	55,5	223,8	7,1	-1,3	217,9	0,3	0,0	217,6	62%	80%	97%	100%	78%	
13	720	272,0	448,0	360,8	11,8				349,0		87,3	0,0	87,3	0,5	3,8	83,0	0,0	0,0	83,0	19%	100%	95%	100%	95%	
14	720	264,0	456,0	134,3	5,8	48,0	27,0	27,8	9,8	16,0	321,8	40,5	281,3	-24,1	0,5	304,8	20,5	0,0	284,3	71%	87%	108%	93%	88%	
15	720	272,0	448,0	190,8	2,3	160,0	23,5	5,0			257,3	14,3	243,0	-8,8	1,4	250,4	3,2	0,0	247,2	57%	94%	103%	99%	96%	
16	720	264,0	456,0	378,5	6,0	267,0	50,8	26,8	28,0		77,5	33,3	44,3	0,0	-0,7	45,0	1,0	0,0	44,0	17%	57%	102%	98%	57%	
17	720	264,0	456,0	241,5	13,5	56,0	33,0	14,3	124,8		214,5	18,5	196,0	-2,6	-2,4	201,1	0,0	0,0	201,1	47%	91%	103%	100%	94%	
18	720	264,0	456,0	337,0	5,0	256,0	34,0	18,0	24,0		119,0	44,8	74,3	0,3	1,1	72,8	0,9	0,0	71,9	26%	62%	98%	99%	60%	
20	720	264,0	456,0	24,8	2,5	8,0	7,3	7,0			431,3	64,0	367,3	-8,2	0,7	374,7	3,7	0,0	370,9	95%	85%	102%	99%	86%	
21	720	264,0	456,0	84,0	6,0	16,0	31,8	21,3	9,0		372,0	13,8	358,3	8,2	8,0	342,1	16,6	0,0	325,5	82%	96%	95%	95%	87%	
22	720	264,0	456,0	339,8	6,8				333,0		116,3	1,8	114,5	0,0	1,6	112,9	0,0	0,0	112,9	25%	98%	99%	100%	97%	
23	720	264,0	456,0	82,5	2,0	24,0	33,5	23,0			373,5	74,8	298,8	9,9	6,0	282,9	13,1	0,0	269,8	82%	80%	95%	95%	72%	
24	720	264,0	456,0	43,5	9,8	8,0	15,8	10,0			412,5	95,0	317,5	3,2	3,4	310,9	18,5	0,0	292,4	90%	77%	98%	94%	71%	
25	720	264,0	456,0	40,8	4,3	8,0	19,0	8,5	1,0		415,3	67,5	347,8	5,3	-7,4	349,8	15,7	0,0	334,1	91%	84%	101%	95%	80%	
26	720	256,0	464,0	208,8	7,5	158,0	17,8	25,5			255,3	30,3	225,0	21,4	0,4	203,2	4,1	0,0	199,1	55%	88%	90%	98%	78%	
27	720	264,0	456,0	135,8	10,5	104,0	8,0	13,3			320,3	13,0	307,3	2,7	3,6	300,9	5,4	0,0	295,6	70%	96%	98%	98%	92%	
28	720	264,0	456,0	164,3	117,3	40,0	2,0	5,0			291,8	157,5	134,3	3,4	-1,0	131,8	11,4	0,0	120,4	64%	46%	98%	91%	41%	
29	720	264,0	456,0	218,0	2,5	120,0	51,0	12,5	32,0		238,0	22,0	216,0	2,5	4,1	209,4	3,1	0,0	206,3	52%	91%	97%	99%	87%	
30	720	264,0	456,0	188,5	14,8	112,0	45,0	16,8			267,5	40,5	227,0	4,9	0,3	221,8	1,1	0,0	220,7	59%	85%	98%	99%	83%	
33	720	272,0	448,0	267,0	16,0	204,0	34,0	5,0	8,0		181,0	90,0	91,0	2,0	-0,3	89,3	0,0	0,0	89,3	40%	50%	98%	100%	49%	
			12720	5541	289	2834	699	353	1338	28	7179	1371	5809	54	12	5743	145	0	5598	56,4%	80,9%	98,9%	97,5%	78,0%	

Capacity utilization (Planned production time / Planned operating time) X **OEE** (OEEa x OEEp x OEEq) = **PI (Production Index)** (Capacity Utilization x OEE)

PI Notes:

PI (Production Index): Real efficient machine usage against total installed capacity (planned operating time).

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