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APPENDICES

APPENDIX A
DOCUMENT FORM

Investment Casting Order Form

Date _____ Start _____ Finish _____	ORDER _____	Metal type _____
Design	Quantity	Total weight _____ g Rubber weight _____ g Wax weight _____ g Weight _____ g Remark _____ Operator _____ Shop _____

No. _____

Job order Form

From shop _____

Date _____

Production order No. _____

To shop _____

Product code	Detail	Quantity	Remark

Distribute by _____ Receive by _____ Authorise by _____

Sending Product Form

Shop () Object () Gem						Date _____	
Production Order No.	Customer name	Design	Size			Quantity	Weight
							Metal Gem
_____		_____			_____		
Product maker		Product Receiver			Inventory Recorder		

Basket Control Document Form (Version 1)

Size: _____

Total ___ pages : Page ___ / ___

Colour: _____

Basket No. _____ Product No. _____ Production order No. _____ Due date _____ Date _____

	Reorder			Rework to fill			Send on re-work			Send on die		Re-work to fill		Return re-work		Make new material			
	date	from		date	from	remain	date	Rejected Qty.	remain	Date	To	date	from	Date	To	date	Name	Return date	name
	Gem colour	size	Qty.	Qty.			Qty.			Qty.	remain	Qty.		Rework Qty.	Return Qty.	Qty.	weight	Qty.	weight
Coordinator																			
Shaping																			
Coordinator																			
Polishing																			
Coordinator																			

Basket Control Document Form – continue (Version 1)

Size: _____

Total ___ pages : Page ___ / ___

Colour: _____

Basket No. _____ Product No. _____ Production order No. _____ Due date _____ Date _____

Step	Receive order			Rework			Send out rework			Send to rework		Return rework		Return to work		Take new material				
	date	from		date	From	remain	date	Rejected Qty.	remain	Date	To	date	from	Date	To	date	Name	Return date	name	
	Gem colour	size	Qty.	Qty.			Qty.			Qty.	remain	Qty.		Rework Qty.	Return Qty.	Qty.	weight	Qty.	weight	
Setting stone into metal																				
Polishing																				
Q.C.																				
Coating																				
Q.C.																				
Export																				

Basket Control Document Form (Version 2)

Basket code A- _____ Production order No. _____ Due date _____
 Basket code _____ Product code _____ Colour _____ Size _____

Process flow	Date		Quantity		Rework quantity	Processor	REMARK
	receive	distribute	receive	distribute			
Investment casting							
Coordinator							
Shaping							
Coordinator							
Polishing							
Coordinator							
Setting into metal							
Polishing							
Q.C.							
Coating							
Shaping							
Q.C.							
Export							

Basket Control Document Form (Version 3)

Basket code A- _____ Production order No. _____ Due date _____
 Basket code _____ Product code _____ Colour _____ Size _____

Process flow	Receive		Distribute		Rework quantity	Processor	REMARK
	Date	Quantity	Date	Quantity			
Investment casting							
Coordinator							
Shaping							
Coordinator							
Polishing							
Coordinator							
Setting into metal							
Polishing							
Q.C.							
Coating							
Shaping							
Q.C.							
Export							

Basket Control Document Form (Version 4)

Basket code A- Production order No. _____ Due date _____
 Basket code _____ Product code _____ Colour _____ Size _____

Process flow	Receive		Distribute		Rework quantity	Processor	REMARK
	Date	Quantity	Date	Quantity			
Investment casting							
Coordinator							
Shaping							
Coordinator							
Polishing							
Coordinator							
Setting into metal							
Setting into wax							
Polishing							
Q.C.							
Coating							
Shaping							
Q.C.							
Export							

Rework Basket Control Document Form (Version 3)

			Production order No. _____	Product Code _____			
1	2	3	Colour _____	Size _____	Rework distributor _____		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Broken gem	Qty. ___/___/___	Basket ___/___/___	Inspector ___/___/___	Reworker ___/___/___
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Loose gem	Qty. ___/___/___	Basket ___/___/___	Inspector ___/___/___	Reworker ___/___/___
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Spot	Qty. ___/___/___	Basket ___/___/___	Inspector ___/___/___	Reworker ___/___/___
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hole	Qty. ___/___/___	Basket ___/___/___	Inspector ___/___/___	Reworker ___/___/___
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Scratch	Qty. ___/___/___	Basket ___/___/___	Inspector ___/___/___	Reworker ___/___/___
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Skin	Qty. ___/___/___	Basket ___/___/___	Inspector ___/___/___	Reworker ___/___/___
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Rough polish	Qty. ___/___/___	Basket ___/___/___	Inspector ___/___/___	Reworker ___/___/___
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fine polish	Qty. ___/___/___	Basket ___/___/___	Inspector ___/___/___	Reworker ___/___/___
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Shaping edge	Qty. ___/___/___	Basket ___/___/___	Inspector ___/___/___	Reworker ___/___/___
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Adhere glue	Qty. ___/___/___	Basket ___/___/___	Inspector ___/___/___	Reworker ___/___/___

Rework Form (Version 4)

Production order no. _____ Date _____
 Product code _____ colour _____ size _____
 Basket no. _____
 Reason for rework _____ shop _____
 Qty. _____ Inspector _____
 Rework by _____ Return by _____
 Receive Qty. _____ Receive by _____

Rework Form (Version 5)

Date _____ Production order number _____

Product code _____ Size _____ Quantity _____

Basket code _____ Reason of rework _____

Inspector _____ Rework distributor _____ Shop _____

Receive rework by _____ Rework by _____ Shop _____

Return rework by _____ Quantity _____

Receive rework by _____ Quantity _____

Rework Form (Version 6)

Date _____	To shop	Rework reason	From shop
Production order no. _____	<input type="checkbox"/> shaping	<input type="checkbox"/> object _____	<input type="checkbox"/> polishing
Product code _____	<input type="checkbox"/> polishing	<input type="checkbox"/> gem _____	<input type="checkbox"/> Q.C.
Size _____ colour _____	<input type="checkbox"/> setting stone	<input type="checkbox"/> check spring box	<input type="checkbox"/> coordinator
Qty. _____ pcs.	<input type="checkbox"/> coating	Other _____	<input type="checkbox"/> setting stone
Basket no. _____	<input type="checkbox"/> within shop	Receive by _____	Inspector _____
	Rework by _____		

APPENDIX B
DELIVERY DATA

JULY 1999

Order No.	Amount	Delivery Schedule	Actual Delivery	No. of Variation
1	162	9/7/99	12/7/99	-3
2	366	9/7/99	12/7/99	-3
3	707	9/7/99	9/7/99	0
4	38	11/7/99	13/7/99	-2
5	60	13/7/99	9/7/99	+4
6	1200	13/7/99	26/7/99	-13
7	157	14/7/99	14/7/99	0
8	12	16/7/99	19/7/99	-3
9	97	19/7/99	19/7/99	0
10	650	21/7/99	21/7/99	0
11	1310	22/7/99	15/7/99	+7
12	1574	25/7/99	26/7/99	-1
13	126	26/7/99	26/7/99	0
14	1120	29/7/99	29/7/99	0
15	1185	29/7/99	18/8/99	-20
16	100	29/7/99	6/8/99	-8
17	21	29/7/99	30/7/99	-1
18	2620	31/7/99	4/8/99	-4
19	100	31/7/99	4/8/99	-4
20	4925	31/7/99	2/8/99	-2
21	100	31/7/99	4/8/99	-4
TOTAL	16630	TOTAL DELIVERY LATE DAY		68

AUGUST/1999

Order No.	Amount	Delivery Schedule	Actual Delivery	No. of Variation
1	205	1/8/99	6/8/99	-5
2	925	2/8/99	18/8/99	-16
3	150	2/8/99	2/8/99	0
4	60	3/8/99	6/8/99	-3
5	900	5/8/99	18/8/99	-13
6	680	5/8/99	23/8/99	-18
7	905	5/8/99	25/8/99	-20
8	2500	5/8/99	19/8/99	-14
9	1200	5/8/99	5/8/99	0
10	2700	5/8/99	5/8/99	0
11	50	5/8/99	6/8/99	-1
12	50	31/8/99	1/9/99	-1
13	76	7/8/99	10/8/99	-3
14	940	10/8/99	27/8/99	-17
15	1495	10/8/99	23/8/99	-13
16	1440	10/8/99	17/8/99	-17
17	1700	11/8/99	11/8/99	0
18	1000	12/8/99	27/8/99	-15
19	109	14/8/99	16/8/99	-2
20	480	15/8/99	16/8/99	-1
21	1050	15/8/99	27/8/99	-12
22	430	16/8/99	27/8/99	-11
23	440	17/8/99	2/9/99	-16
24	89	17/8/99	21/8/99	-4
25	350	22/8/99	6/9/99	-14
26	136	25/8/99	31/8/99	-6
27	2050	25/8/99	25/8/99	0
28	24	30/8/99	31/8/99	-1
29	93	30/8/99	31/8/99	-1
30	300	31/8/99	2/9/99	-2
TOTAL	22527	TOTAL DELIVERY LATE DAY		226

SEPTEMBER/1999

Order No.	Amount	Delivery Schedule	Actual Delivery	No. of Variation
1	350	6/9/99	6/9/99	0
2	42	8/9/99	8/9/99	0
3	2	8/9/99	8/9/99	0
4	378	9/9/99	9/9/99	0
5	385	9/9/99	9/9/99	0
6	100	9/9/99	6/9/99	+3
7	425	12/9/99	13/9/99	-1
8	20	14/9/99	14/9/99	0
9	200	15/9/99	15/9/99	0
10	658	16/9/99	16/9/99	0
11	669	16/9/99	16/9/99	0
12	343	20/9/99	20/9/99	0
13	650	22/9/99	21/9/99	+1
14	264	25/9/99	28/9/99	-3
15	550	28/9/99	22/9/99	+6
16	450	30/9/99	5/10/99	-5
17	1135	30/9/99	8/10/99	-8
18	414	30/9/99	5/10/99	-5
19	400	30/9/99	30/9/99	0
TOTAL	7435	TOTAL DELIVERY LATE DAY		22



MARCH 2000

Order No.	Amount	Delivery Schedule	Actual Delivery	No. of Variation
1	1990	1/3/00	2/3/00	-1
2	85	1/3/00	24/2/00	+6
3	75	1/3/00	24/2/00	+6
4	500	2/3/00	3/3/00	-1
5	336	3/3/00	8/3/00	-5
6	900	3/3/00	7/3/00	-4
7	7	4/3/00	20/3/00	-16*
8	61	8/3/00	7/3/00	+1
9	229	8/3/00	9/3/00	-1
10	20	10/3/00	24/2/00	+15
11	2178	11/3/00	13/3/00	-2
12	500	13/3/00	8/3/00	+5
13	8500	15/3/00	21/3/00	-6
14	102	15/3/00	15/3/00	0
15	60	17/3/00	8/4/00	-22*
16	1110	18/3/00	18/3/00	0
17	180	19/3/00	19/3/00	0
18	60	20/3/00	21/3/00	-1
19	300	20/3/00	21/3/00	-1
20	600	21/3/00	7/3/00	+14
21	695	23/3/00	18/3/00	+5
22	900	24/3/00	27/3/00	-3
23	701	24/3/00	25/4/00	-1
24	1650	24/3/00	23/3/00	+1
25	1175	24/3/00	18/3/00	+6
26	618	25/3/00	23/3/00	+2
27	1000	27/3/00	29/3/00	-2
28	20	28/3/00	27/3/00	+1
29	194	28/3/00	27/3/00	+1
30	1220	24/3/00	24/3/00	0
31	925	31/3/00	31/3/00	0
32	1470	31/3/00	4/4/00	-4
33	424	31/3/00	4/4/00	-4
34	100	31/3/00	31/3/00	0
TOTAL	28885	TOTAL DELIVERY LATE DAY		74

“*” indicates the local order that negotiation is made when the order is delivered delay.

APRIL 2000

Order No.	Amount	Delivery Schedule	Actual Delivery	No. of Variation
1	66	5/4/00	8/4/00	-3
2	62	5/4/00	8/4/00	-3
3	689	5/4/00	8/4/00	-3
4	248	7/4/00	7/4/00	0
5	126	8/4/00	9/4/00	-1
6	744	10/4/00	11/4/00	-1
7	213	11/4/00	10/4/00	+1
8	237	18/4/00	18/4/00	0
9	84	18/4/00	18/4/00	0
10	20	19/4/00	19/4/00	0
11	320	20/4/00	22/4/00	-2
12	152	20/4/00	11/5/00	-21*
13	388	20/4/00	11/4/00	-21*
14	101	20/4/00	27/5/00	-37*
15	2770	20/4/00	21/4/00	-1
16	30	20/4/00	21/4/00	-1
17	39	23/4/00	25/4/00	-2
18	100	24/4/00	25/4/00	-1
19	20	25/4/00	26/4/00	-1
20	6125	25/4/00	26/4/00	-1
21	100	26/4/00	28/4/00	-2
22	720	27/4/00	27/4/00	0
23	150	29/4/00	2/5/00	-3
24	50	29/4/00	29/4/00	0
25	1200	29/4/00	4/5/00	-5
26	60	29/4/00	30/4/00	-1
TOTAL	14814	TOTAL DELIVERY LATE DAY		110

“*” indicates the local order that negotiation is made when the order is delivered delay.

MAY 2000

Order No.	Amount	Delivery Schedule	Actual Delivery	No. of Variation
1	286	3/5/00	4/5/00	-1
2	200	4/5/00	4/5/00	0
3	200	5/5/00	5/5/00	0
4	57	5/5/00	27/5/00	-22*
5	25	5/5/00	5/5/00	0
6	254	8/5/00	24/5/00	-16*
7	10	8/5/00	24/5/00	-16*
8	27	8/5/00	8/5/00	0
9	200	8/5/00	8/5/00	0
10	394	10/5/00	1/6/00	-22*
11	105	10/5/00	8/5/00	+2
12	86	11/5/00	29/5/00	-18*
13	1446	15/5/00	15/5/00	0
14	30	15/5/00	16/5/00	-1
15	9	15/5/00	16/5/00	-1
16	193	18/5/00	19/5/00	-1
17	30	17/5/00	24/5/00	-7*
18	385	20/5/00	30/5/00	-10*
19	140	20/5/00	1/6/00	-11*
20	133	20/5/00	29/5/00	-9*
21	770	24/5/00	19/5/00	+5
22	44	24/5/00	23/5/00	+1
23	500	30/5/00	26/5/00	+4
24	490	31/5/00	23/5/00	+8
25	102	31/5/00	25/5/00	+6
TOTAL	6116	TOTAL DELIVERY LATE DAY		135

*** indicates the local order that negotiation is made when the order is delivered delay.*

APPENDIX C
EXAMPLE OF PRE-PRODUCTION PLAN

Manufacturing Process Form

Production Order No. 3/2000

Customer Code 027

Due Date 15/3/200

Product Code 10888

Quantity 2,500 pcs.

Manufacturing Process	Estimated Time for processing (day)	Previous Process	Note
1. Wax Casting	7	-	
2. Setting into wax	4	Wax Casting	
3. Treeing	3	Setting into wax	
4. Investment Casting	3	Treeing	
5. Shaping	5	Investment Casting	
6. Setting into metal object	2	Shaping	
7. Polishing	3	Setting into metal object Polishing	
8. Q.C.	2	Polishing	
9. Coating	2	Q.C.	

Manufacturing Process Form

Production Order No. 11/2000

Customer Code 007

Due Date 18/3/200

Product Code 10713

Quantity 1,110 pcs.

Manufacturing Process	Estimated Time for processing (day)	Previous Process	Note
1. Wax Casting	6	-	
2. Setting into wax	10	Wax Casting	
3. Treeing	2	Setting into wax	
4. Investment Casting	2	Treeing	
5. Shaping	6	Investment Casting	
6. Setting into metal object	5	Shaping	
7. Polishing	2	Setting into metal object Polishing	
8. Q.C.	2	Polishing	
9. Coating	4 hrs.	Q.C.	

Manufacturing Process Form

Production Order No. 30/2000

Customer Code 022

Due Date 24/3/200

Product Code 11363

Quantity 900 pcs.

Manufacturing Process	Estimated Time for processing (day)	Previous Process	Note
1. Wax Casting	6	-	
2. Setting into wax	8	Wax Casting	
3. Treeing	1.5	Setting into wax	
4. Investment Casting	2	Treeing	
5. Shaping	2.5	Investment Casting	
6. Setting into metal object	6	Shaping	
7. Polishing	3	Setting into metal object Polishing	
8. Q.C.	2	Polishing	
9. Coating	4 hrs.	Q.C.	

Manufacturing Process Form

Production Order No. 24/2000

Customer Code 022

Due Date 25/3/200

Product Code 11365

Quantity 412 pcs.

Manufacturing Process	Estimated Time for processing (day)	Previous Process	Note
1. Wax Casting	2	-	
2. Setting into wax	7	Wax Casting	
3. Treeing	1	Setting into wax	
4. Investment Casting	1	Treeing	
5. Shaping	3	Investment Casting	
6. Setting into metal object	4	Shaping	
7. Polishing	2	Setting into metal object Polishing	
8. Q.C.	1	Polishing	
9. Coating	2 hrs.	Q.C.	

Manufacturing Process Form

Production Order No. 22/2000

Customer Code 022

Due Date 27/3/200

Product Code 11359

Quantity 1,000 pcs.

Manufacturing Process	Estimated Time for processing (day)	Previous Process	Note
1. Wax Casting	8	-	
2. Setting into wax	12	Wax Casting	
3. Treeing	1.5	Setting into wax	
4. Investment Casting	2	Treeing	
5. Shaping	6	Investment Casting	
6. Polishing	1.5	Shaping	
7. Setting into metal object	6	Polishing	
8. Polishing	1.5	Setting into metal object Polishing	
9. Setting into metal object	1	Polishing	
10. Polishing	2	Setting into metal object Polishing	
11. Q.C.	2	Polishing	
12. Coating	2 hrs.	Q.C.	

Manufacturing Process Form

Production Order No. 31/2000

Customer Code 022

Due Date 31/3/200

Product Code 11241

Quantity 1,470 pcs.

Manufacturing Process	Estimated Time for processing (day)	Previous Process	Note
1. Wax Casting	4	-	
2. Setting into wax	12	Wax Casting	
3. Treeing	2	Setting into wax	
4. Investment Casting	2	Treeing	
5. Shaping	7	Investment Casting	
6. Polishing	1.5	Shaping	
7. Setting into metal object	6	Polishing	
8. Polishing	1.5	Setting into metal object Polishing	
9. Shaping	2	Polishing	
10. Polishing	2	Shaping	
11. Q.C.	2	Polishing	
12. Coating	4 hrs.	Q.C	

Production Plan (Overall)

Order no.	Production Plan (Overall)																															Production																																	
	<i>Jan.</i>									<i>Feb.</i>													<i>Mar.</i>																																										
Code	14	15	17	18	19	20	21	22	24	25	26	27	28	29	31	1	2	3	7	8	9	10	11	12	14	15	16	17	18	19	21	22	23	24	25	26	28	29	1	2	3	4	6	7	8	9	10	11	13	14	15	16	17	18	20	21	22	23	24	25	27	28	29	30	31
16/2000	-----																															Earliest production																																	
10692																							-----									Latest production																																	
500 pcs.																																Actual production																																	
3/2000	-----																															Earliest production																																	
10888																							-----									Latest production																																	
2500 pcs.																																Actual production																																	
11/2000	-----																															Earliest production																																	
10713																							-----									Latest production																																	
1110 pcs.																																Actual production																																	
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11363																							-----									Latest production																																	
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Shop : Setting Stone into Wax

Production Plan

Order no.	Jan.																															Feb.																															Mar.																															Production																																																		
Code	14	15	17	18	19	20	21	22	24	25	26	27	28	29	31	1	2	3	7	8	9	10	11	12	14	15	16	17	18	19	21	22	23	24	25	26	28	29	1	2	3	4	6	7	8	9	10	11	13	14	15	16	17	18	20	21	22	23	24	25	27	28	29	30	31																																																																															
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Shop : Tree

Production Plan

Order no.	Jan.														Feb.														Mar.														Production																								
Code	14	15	17	18	19	20	21	22	24	25	26	27	28	29	31	1	2	3	7	8	9	10	11	12	14	15	16	17	18	19	21	22	23	24	25	26	28	29	1	2	3	4		6	7	8	9	10	11	13	14	15	16	17	18	20	21	22	23	24	25	27	28	29	30	31	
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31/2000																																																																		Earliest production	
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1470 pcs.																																																																			Actual production

Shop : Polishing

Production Plan

Order no.	Jan.												Feb.												Mar.													Production																															
	14	15	17	18	19	20	21	22	24	25	26	27	28	29	31	1	2	3	7	8	9	10	11	12	14	15	16	17	18	19	21	22	23	24	25	26	28		29	1	2	3	4	6	7	8	9	10	11	13	14	15	16	17	18	20	21	22	23	24	25	27	28	29	30	31			
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Shop : Setting Stone into Metal Object

Production Plan

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Code	14	15	17	18	19	20	21	22	24	25	26	27	28	29	31	1	2	3	7	8	9	10	11	12	14	15	16	17	18	19	21	22	23	24	25	26	28	29	1	2	3	4	6	7	8	9	10	11	13	14	15	16	17	18	20	21	22	23	24	25	27	28	29	30	31																													
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BIOGRAPHY

Nuntiya Jirawangul was born on August 19th, 1974 in Khonkaen, Thailand. She graduated from The University of the Thai Chamber of Commerce in 1995 with a Bachelor degree in Electrical Engineering. In 1998, she studied for the Master degree in Engineering Management at The Regional Centre for Manufacturing Systems Engineering, Faculty of Engineering, Chulalongkorn University and University of Warwick.