

# Supplementary Materials

This section contains the data utilized to derive the current research paper. Data regarding the KRI-KRI facility and cases A are available in unit 1, while data regarding the TYRAS facility and cases B are available in unit 2. It is noted that the data are slightly altered for confidentiality issues.

## 1. KRI-KRI facility data

Tables S1–S5 contain data concerning the KRI-KRI facility and case studies A. In Table S1 there is a description of the annotations used to refer to the problem’s basic elements. Information about products characteristics, production restrictions and storage costs is available at Table S2. It is noted that J5 represents the additional packing line considered in plant capacity expansion cases and is either identical to J1 or J2. In Table S3 the studied product demand is depicted. Table S4 contains the changeover costs based on the changeover duration. Finally, Table S5 provides information regarding families changeover times.

**Table S1.** Annotations used for cases of the KRI-KRI facility.

Products	<b>P01-P93</b>
Recipes	<b>R01-R12</b>
Families	<b>F01-F23</b>
Packing lines	<b>J1-J5</b>
Scheduling horizon in days	<b>1-5</b>

**Table S2.** Product characteristics for cases of the KRI-KRI facility.

<b>Product</b>	<b>Weight (kg)</b>	<b>Family</b>	<b>Recipe</b>	<b>Line</b>	<b>Packing rate (kg/h)</b>	<b>Min amount (kg)</b>	<b>Inventory cost (€/kg)</b>
P01	0.60	F01	R08	J3	1710	82.8	9.00
P02	0.60	F01	R08	J3	1710	82.8	7.50
P03	0.60	F01	R08	J3	1710	82.8	6.75
P04	0.60	F01	R08	J3	1710	82.8	6.00
P05	0.60	F01	R08	J3	1710	82.8	6.00
P06	0.60	F02	R09	J3	1710	82.8	6.00
P07	0.60	F02	R09	J3	1710	82.8	5.25
P08	0.60	F02	R09	J3	1710	82.8	5.25
P09	0.60	F03	R10	J3	1710	82.8	6.00
P10	0.60	F03	R10	J3	1710	82.8	5.25
P11	0.60	F03	R10	J3	1710	82.8	5.25
P12	0.60	F04	R01	J3	1710	82.8	8.25
P13	0.60	F04	R01	J3	1710	82.8	6.75
P14	0.60	F04	R01	J3	1710	82.8	6.00
P15	0.60	F04	R01	J3	1710	82.8	5.25
P16	0.60	F04	R01	J3	1710	82.8	5.25

Product	Weight (kg)	Family	Recipe	Line	Packing rate (kg/h)	Min amount (kg)	Inventory cost (€/kg)
P17	0.60	F05	R02	J3	1710	82.8	9.00
P18	0.60	F05	R02	J3	1710	82.8	6.75
P19	0.60	F05	R02	J3	1710	82.8	7.50
P20	0.60	F05	R02	J3	1710	82.8	6.00
P21	0.20	F05	R02	J3	1820	27.6	5.70
P22	0.20	F05	R02	J3	1820	27.6	5.70
P23	0.40	F06	R07	J3/J4	1320/1150	55.2	0.75
P24	0.20	F06	R07	J3/J4	1390/1204	27.6	0.75
P25	0.20	F06	R07	J3/J4	1390/1204	27.6	0.75
P26	0.38	F07	R07	J3	1140	19.8	0.75
P27	0.38	F07	R07	J3	1140	19.8	0.75
P28	0.40	F08	R11	J3/J4	2400/2700	55.2	1.35
P29	0.40	F08	R11	J3/J4	2400/2700	55.2	1.35
P30	0.60	F08	R11	J3/J4	2250/2520	82.8	1.65
P31	0.60	F08	R11	J3/J4	2250/2520	82.8	1.65
P32	0.60	F08	R11	J3/J4	2250/2520	82.8	1.65
P33	0.60	F08	R11	J3/J4	2250/2520	82.8	1.65
P34	0.45	F09	R11	J3/J4	1215	62.1	0.45
P35	0.45	F09	R11	J3/J4	1215	62.1	0.45
P36	0.15	F09	R11	J3/J4	1350	20.7	1.20
P37	0.15	F09	R11	J3/J4	1350	20.7	1.20
P38	0.15	F09	R11	J3/J4	1350	20.7	1.20
P39	0.13	F10	R11	J3/J4	850	11.3	1.80
P40	0.13	F10	R11	J3/J4	850	11.3	1.80
P41	0.13	F10	R11	J3/J4	850	11.3	1.80
P42	1.00	F11	R01	J2/J5	2200	33.0	3.30
P43	1.00	F11	R01	J2/J5	2200	33.0	4.20
P44	1.00	F11	R01	J2/J5	2200	33.0	4.20
P45	1.00	F12	R02	J2/J5	2200	33.0	4.20
P46	1.00	F12	R02	J2/J5	2200	33.0	3.00
P47	1.00	F12	R02	J2/J5	2200	33.0	3.00
P48	1.00	F13	R03	J2/J5	2200	33.0	2.55
P49	1.00	F13	R03	J2/J5	2200	33.0	2.10
P50	1.00	F13	R03	J2/J5	2200	33.0	2.10
P51	1.00	F14	R04	J2/J5	2200	33.0	3.60
P52	1.00	F14	R04	J2/J5	2200	33.0	3.60
P53	0.50	F15	R04	J2/J5	1150	28.0	3.60
P54	0.50	F15	R04	J2/J5	1150	28.0	3.60
P55	0.50	F16	R11	J2/J5	1150	16.5	1.80
P56	0.50	F16	R11	J2/J5	1150	16.5	1.80
P57	0.50	F16	R11	J2/J5	1150	16.5	1.80
P58	0.50	F16	R11	J2/J5	1150	16.5	1.80
P59	0.50	F16	R11	J2/J5	1150	16.5	1.80

Product	Weight (kg)	Family	Recipe	Line	Packing rate (kg/h)	Min amount (kg)	Inventory cost (€/kg)
P60	0.50	F16	R11	J2/J5	1150	16.5	1.80
P61	0.75	F17	R11	J2/J5	1320	27.0	0.90
P62	0.75	F17	R11	J2/J5	1320	27.0	0.90
P63	0.75	F17	R11	J2/J5	1320	27.0	0.90
P64	0.75	F17	R11	J2/J5	1320	27.0	0.60
P65	0.75	F17	R11	J2/J5	1320	27.0	0.90
P66	0.75	F17	R11	J2/J5	1320	27.0	0.60
P67	0.75	F17	R11	J2/J5	1320	27.0	0.90
P68	0.75	F17	R11	J2/J5	1320	27.0	0.60
P69	0.75	F17	R11	J2/J5	1320	27.0	0.90
P70	0.75	F17	R11	J2/J5	1320	27.0	0.60
P71	0.75	F17	R11	J2/J5	1320	27.0	0.60
P72	1.00	F18	R07	J2/J5	2100	33.0	0.75
P73	1.00	F18	R07	J2/J5	2100	33.0	0.75
P74	1.00	F19	R06	J2/J5	2100	33.0	0.45
P75	1.00	F19	R06	J2/J5	2100	33.0	0.75
P76	1.00	F19	R06	J2/J5	2100	33.0	0.75
P77	5.00	F20	R05	J1/J5	2250	80.0	3.30
P78	5.00	F20	R05	J1/J5	2100	80.0	3.60
P79	5.00	F20	R05	J1/J5	2100	80.0	3.60
P80	30.00	F21	R06	J1/J5	2790	90.0	0.45
P81	30.00	F21	R06	J1/J5	2790	90.0	0.75
P82	30.00	F21	R06	J1/J5	2790	90.0	0.75
P83	10.00	F22	R06	J1/J5	2350	100.0	0.75
P84	10.00	F22	R06	J1/J5	2350	100.0	0.45
P85	5.00	F22	R06	J1/J5	2250	80.0	0.30
P86	5.00	F22	R06	J1/J5	2250	80.0	0.45
P87	5.00	F22	R06	J1/J5	2150	80.0	0.75
P88	5.00	F22	R06	J1/J5	2150	80.0	0.45
P89	5.00	F22	R06	J1/J5	2150	80.0	0.45
P90	0.15	F23	R12	J4	690	32.3	1.80
P91	0.15	F23	R12	J4	690	32.3	1.80
P92	0.15	F23	R12	J4	690	32.3	1.80
P93	0.15	F23	R12	J4	690	32.3	1.80

**Table S3.** Product demand for cases of the KRI-KRI facility.

Day					Day				
1	2	3	4	5	1	2	3	4	5
P01	2349				P48				2132
P02		1314			P49				5495
P03			2650		P50				1830

Day					Day				
1	2	3	4	5	1	2	3	4	5
P04	3678			8401	P51				9380
P05				3288	P52				1272
P06			3533		P53				658
P07				6745	P54				658
P08				2400	P55			2391	
P09			1133		P56			2158	
P10				737	P57			1581	
P11				429	P58			1594	
P12	2136				P59			1594	
P13		2529			P60			1158	
P14			2650		P61				1056
P15				3805	P62				947
P16				2229	P63	4315			
P17	1391				P64	1439			
P18			1555		P65	2736			
P19		3683			P66				1472
P20				3888	P67	1986			
P21				324	P68				3512
P22				276	P69	1722			
P23			6927		P70				408
P24			839		P71				164
P25			2995		P72	2199		2040	
P26	1775				P73	1283			
P27	504				P74				40
P28	1325				P75				1071
P29	1325				P76				117
P30				2209	P77				285
P31				2881	P78				6740
P32				4949	P79				975
P33				2434	P80		28800		
P34	1112				P81		34800		
P35	1112				P82		27000		
P36	3974				P83				7100
P37	1430				P84				2900
P38	708				P85				1000
P39				512	P86				2590
P40				718	P87				5650
P41				147	P88				7210
P42			3300		P89			15750	
P43				1807	P90	471			1521
P44				2019	P91	468			812

Day					Day				
1	2	3	4	5	1	2	3	4	5
P45				1578	P92	1484			435
P46				2518	P93	1233			180
P47				1690					

**Table S4.** Changeover cost according to changeover duration for cases of the KRI-KRI facility.

Changeover type	Changeover cost (€)
0.00	750
0.25	1125
0.50	1800
0.75	2250
1.00	6000
1.50	15000
2.00	22500

**Table S5.** Changeover times data for cases of the KRI-KRI facility.

Line	Family	Family																						
		F01	F02	F03	F04	F05	F06	F07	F08	F09	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19	F20	F21	F22	F23
J3	F01	0.00	0.00	0.00	0.50	0.50	0.50	0.50	1.00	1.50	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-
J3	F02	- *	0.00	0.00	0.50	0.50	0.50	0.50	1.00	1.50	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-
J3	F03	-	-	0.00	0.50	0.50	0.50	0.50	1.00	1.50	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-
J3	F04	-	-	-	0.00	-	1.00	1.50	0.50	0.75	0.75	-	-	-	-	-	-	-	-	-	-	-	-	-
J3	F05	-	-	-	0.25	0.00	0.50	0.75	1.00	1.50	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-
J3	F06	-	-	-	-	-	0.00	0.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J4	F06	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.00
J3	F07	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J3	F08	-	-	-	-	-	2.00	2.00	0.00	0.50	0.50	-	-	-	-	-	-	-	-	-	-	-	-	-
J4	F08	-	-	-	-	-	2.00	-	0.00	0.50	0.50	-	-	-	-	-	-	-	-	-	-	-	-	2.00
J3	F09	-	-	-	-	-	2.00	2.00	-	0.00	0.50	-	-	-	-	-	-	-	-	-	-	-	-	-
J4	F09	-	-	-	-	-	2.00	-	-	0.00	0.50	-	-	-	-	-	-	-	-	-	-	-	-	2.00
J3	F10	-	-	-	-	-	2.00	2.00	-	-	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-
J4	F10	-	-	-	-	-	2.00	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-	-	-	2.00
J2	F11	-	-	-	-	-	-	-	-	-	-	0.00	-	1.00	1.00	1.50	2.00	2.00	1.00	1.00	-	-	-	-
J2	F12	-	-	-	-	-	-	-	-	-	-	0.50	0.00	0.50	0.50	1.00	2.00	2.00	0.50	0.50	-	-	-	-
J2	F13	-	-	-	-	-	-	-	-	-	-	-	-	0.00	0.50	1.00	2.00	2.00	-	-	-	-	-	-
J2	F14	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	0.50	2.00	2.00	-	-	-	-	-	-
J2	F15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	1.50	2.00	-	-	-	-	-	-
J2	F16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	0.50	-	-	-	-	-	-
J2	F17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-
J2	F18	-	-	-	-	-	-	-	-	-	-	-	-	0.50	0.50	1.00	2.00	2.00	0.00	-	-	-	-	-
J2	F19	-	-	-	-	-	-	-	-	-	-	-	-	0.50	0.50	1.00	2.00	2.00	0.50	0.00	-	-	-	-
J1	F20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	0.50	1.00	-
J1	F21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	0.50	-
J1	F22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-
J4	F23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00

\* (-) impossible changeover

## 2. TYRAS facility data

Tables S6-S9 contain data concerning the TYRAS facility and case studies B. In Table S6 there is a description of the annotations used to refer to the problem's basic elements. Information about products characteristics, production restrictions and storage costs is available at Table S7. It is noted that J8 represents the additional packing line considered in plant capacity expansion cases and is identical to J2. In Table S8 the studied product demand is depicted. Finally, Table S9 provides information regarding families changeover times.

**Table S6.** Annotations used for cases of the TYRAS facility.

Products	<b>P01-P176</b>
Recipes	<b>R01-R16</b>
Families	<b>F01-F41</b>
Packing lines	<b>J1-J8</b>
Scheduling horizon in days	<b>1-7</b>

**Table S7.** Product characteristics for cases of the TYRAS facility.

Product	Weight (kg)	Family	Recipe	Line	Packing rate (kg/h)
P01	0.15	F01	R01	J1/J2/J3/J8	900/900/1080/900
P02	0.17	F01	R01	J1/J2/J3/J8	1020/1020/1224/1020
P03	0.15	F01	R01	J1/J2/J3/J8	900/900/1080/900
P04	0.15	F01	R01	J1/J2/J3/J8	900/900/1080/900
P05	0.40	F01	R01	J1/J2/J3/J8	2400/2400/2880/2400
P06	0.15	F01	R01	J1/J2/J3/J8	900/900/1080/900
P07	0.15	F01	R01	J1/J2/J3/J8	900/900/1080/900
P08	0.60	F01	R01	J1/J2/J3/J8	1200/1200/1440/1200
P09	0.15	F01	R01	J1/J2/J3/J8	900/900/1080/900
P10	0.15	F01	R01	J1/J2/J3/J8	900/900/1080/900
P11	0.15	F01	R01	J1/J2/J3/J8	900/900/1080/900
P12	0.50	F01	R01	J1/J2/J3/J8	3000/3000/3600/3000
P13	0.30	F01	R01	J1/J2/J3/J8	900/900/1080/900
P14	0.40	F01	R01	J1/J2/J3/J8	2400/2400/2880/2400
P15	0.30	F01	R01	J1/J2/J3/J8	900/900/1080/900
P16	0.15	F01	R01	J1/J2/J3/J8	900/900/1080/900
P17	0.15	F01	R01	J1/J2/J3/J8	900/900/1080/900
P18	0.40	F01	R01	J1/J2/J3/J8	2400/2400/2880/2400
P19	0.51	F01	R01	J1/J2/J3/J8	1020/1020/1224/1020
P20	0.40	F01	R01	J1/J2/J3/J8	2400/2400/2880/2400
P21	1.00	F02	R01	J4	2160
P22	1.00	F02	R01	J4	2160
P23	1.00	F02	R01	J4	2160
P24	1.00	F02	R01	J4	2160
P25	0.15	F03	R01	J1/J2/J3/J8	900/900/1080/900
P26	0.15	F03	R01	J1/J2/J3/J8	900/900/1080/900

Table S7. (Continued)

Product	Weight (kg)	Family	Recipe	Line	Packing rate (kg/h)
P27	0.15	F03	R01	J1/J2/J3/J8	900/900/1080/900
P28	0.15	F03	R01	J1/J2/J3/J8	900/900/1080/900
P29	0.15	F03	R01	J1/J2/J3/J8	900/900/1080/900
P30	0.15	F03	R01	J1/J2/J3/J8	900/900/1080/900
P31	0.17	F03	R01	J1/J2/J3/J8	1020/1020/1224/1020
P32	0.15	F04	R01	J1/J2/J3/J8	900/900/1080/900
P33	0.15	F04	R01	J1/J2/J3/J8	900/900/1080/900
P34	0.15	F04	R01	J1/J2/J3/J8	900/900/1080/900
P35	0.17	F04	R01	J1/J2/J3/J8	1020/1020/1224/1020
P36	0.15	F04	R01	J1/J2/J3/J8	900/900/1080/900
P37	0.15	F04	R01	J1/J2/J3/J8	900/900/1080/900
P38	0.15	F04	R01	J1/J2/J3/J8	900/900/1080/900
P39	0.15	F04	R01	J1/J2/J3/J8	900/900/1080/900
P40	0.15	F05	R01	J1/J2/J3/J8	900/900/1080/900
P41	0.15	F05	R01	J1/J2/J3/J8	900/900/1080/900
P42	0.15	F05	R01	J1/J2/J3/J8	900/900/1080/900
P43	0.17	F05	R01	J1/J2/J3/J8	1020/1020/1224/1020
P44	0.15	F05	R01	J1/J2/J3/J8	900/900/1080/900
P45	0.15	F05	R01	J1/J2/J3/J8	900/900/1080/900
P46	0.15	F05	R01	J1/J2/J3/J8	900/900/1080/900
P47	0.15	F05	R01	J1/J2/J3/J8	900/900/1080/900
P48	0.15	F06	R01	J1/J2/J3/J8	900/900/1080/900
P49	0.15	F06	R01	J1/J2/J3/J8	900/900/1080/900
P50	0.15	F06	R01	J1/J2/J3/J8	900/900/1080/900
P51	0.15	F06	R01	J1/J2/J3/J8	900/900/1080/900
P52	0.15	F06	R01	J1/J2/J3/J8	900/900/1080/900
P53	0.17	F06	R01	J1/J2/J3/J8	1020/1020/1224/1020
P54	0.15	F07	R01	J1/J2/J3/J8	900/900/1080/900
P55	0.15	F07	R01	J1/J2/J3/J8	900/900/1080/900
P56	0.15	F07	R01	J1/J2/J3/J8	900/900/1080/900
P57	0.15	F07	R01	J1/J2/J3/J8	900/900/1080/900
P58	0.17	F07	R01	J1/J2/J3/J8	1020/1020/1224/1020
P59	0.70	F08	R01	J1/J2/J3/J8	1020/1020/1224/1020
P60	0.15	F08	R01	J1/J2/J3/J8	900/900/1080/900
P61	0.15	F08	R01	J1/J2/J3/J8	900/900/1080/900
P62	0.15	F08	R01	J1/J2/J3/J8	900/900/1080/900
P63	0.15	F09	R01	J1/J2/J3/J8	900/900/1080/900
P64	0.15	F09	R01	J1/J2/J3/J8	900/900/1080/900
P65	0.15	F09	R01	J1/J2/J3/J8	900/900/1080/900
P66	0.15	F10	R01	J2/J8	900
P67	0.15	F10	R01	J2/J8	900
P68	0.15	F10	R01	J2/J8	900



**Table S7.** *(Continued)*

<b>Product</b>	<b>Weight (kg)</b>	<b>Family</b>	<b>Recipe</b>	<b>Line</b>	<b>Packing rate (kg/h)</b>
P69	0.17	F11	R01	J1/J2/J3/J8	1020/1020/1224/1020
P70	1.00	F12	R02	J6	2700
P71	1.00	F12	R02	J6	2700
P72	0.50	F12	R02	J6	1350
P73	1.00	F13	R02	J4	2160
P74	1.00	F13	R02	J4	2160
P75	0.60	F14	R02	J1/J2/J3/J8	1200
P76	0.60	F14	R02	J1/J2/J3/J8	1200/1200/1440/1200
P77	0.15	F14	R02	J1/J2/J3/J8	900/900/1080/900
P78	0.15	F14	R02	J1/J2/J3/J8	900/900/1080/900
P79	0.20	F14	R02	J1/J2/J3/J8	1200/1200/1440/1200
P80	0.51	F14	R02	J1/J2/J3/J8	1020/1020/1224/1020
P81	0.30	F14	R02	J1/J2/J3/J8	900/900/1080/900
P82	0.60	F14	R02	J1/J2/J3/J8	1200/1200/1440/1200
P83	0.60	F14	R02	J1/J2/J3/J8	1200/1200/1440/1200
P84	0.15	F15	R02	J2/J8	900
P85	1.00	F16	R03	J6	2700
P86	0.50	F16	R03	J6	1350
P87	0.60	F17	R03	J1/J2/J3/J8	1200/1200/1440/1200
P88	0.15	F17	R03	J1/J2/J3/J8	900/900/1080/900
P89	0.17	F17	R03	J1/J2/J3/J8	1020/1020/1224/1020
P90	0.60	F17	R03	J1/J2/J3/J8	1200/1200/1440/1200
P91	0.51	F17	R03	J1/J2/J3/J8	1020/1020/1224/1020
P92	0.60	F17	R03	J1/J2/J3/J8	1200/1200/1440/1200
P93	5.00	F18	R03	J5	1575
P94	0.30	F19	R04	J1/J2/J3/J8	900/900/1080/900
P95	0.60	F19	R04	J1/J2/J3/J8	1200/1200/1440/1200
P96	0.40	F19	R04	J1/J2/J3/J8	800/800/2880/800
P97	0.40	F19	R04	J1/J2/J3/J8	2400/2400/2880/2400
P98	0.40	F19	R04	J1/J2/J3/J8	2400/2400/2880/2400
P99	0.15	F19	R04	J1/J2/J3/J8	900/900/1080/900
P100	0.15	F19	R04	J1/J2/J3/J8	900/900/1080/900
P101	0.15	F19	R04	J1/J2/J3/J8	900/900/1080/900
P102	0.15	F19	R04	J1/J2/J3/J8	900/900/1080/900
P103	0.15	F19	R04	J1/J2/J3/J8	900/900/1080/900
P104	0.50	F19	R04	J1/J2/J3/J8	3000/3000/3600/3000
P105	0.20	F19	R04	J1/J2/J3/J8	1200/1200/1440/1200
P106	0.45	F19	R04	J1/J2/J3/J8	2700/2700/3240/2700
P107	0.50	F19	R04	J1/J2/J3/J8	3000/3000/3600/3000
P108	1.00	F20	R04	J4	2160
P109	1.00	F20	R04	J4	2160
P110	1.00	F20	R04	J4	2160

Table S7. (Continued)

Product	Weight (kg)	Family	Recipe	Line	Packing rate (kg/h)
P111	1.00	F20	R04	J4	2160
P112	1.00	F20	R04	J4	2160
P113	1.00	F20	R04	J4	2160
P114	5.00	F21	R04	J5	1575
P115	5.00	F21	R04	J5	1575
P116	5.00	F21	R04	J5	1575
P117	1.00	F22	R05	J4	2160
P118	1.00	F22	R05	J4	2160
P119	1.00	F22	R05	J4	2160
P120	5.00	F23	R05	J5	1575
P121	0.15	F24	R05	J1/J2/J3/J8	900/900/1080/900
P122	0.20	F25	R06	J1/J2/J8	1200
P123	0.40	F25	R06	J1/J2/J8	1200
P124	0.20	F25	R06	J1/J2/J8	1200
P125	0.15	F25	R06	J1/J2/J8	900
P126	0.20	F25	R06	J1/J2/J8	1200
P127	0.15	F25	R06	J1/J2/J8	900
P128	0.20	F25	R06	J1/J2/J8	1200
P129	0.20	F25	R06	J1/J2/J8	1200
P130	0.34	F26	R07	J1/J2/J3/J8	1020
P131	0.34	F26	R07	J1/J2/J3/J8	1020
P132	0.29	F27	R08	J7	724
P133	0.29	F28	R08	J7	724
P134	0.29	F29	R08	J7	724
P135	0.29	F30	R08	J7	724
P136	0.30	F31	R09	J7	900
P137	0.30	F32	R10	J1/J2/J3/J8	900/900/2160/900
P138	0.30	F32	R10	J1/J2/J3/J8	900/900/2160/900
P139	0.15	F32	R10	J1/J2/J3/J8	900/900/1080/900
P140	0.15	F32	R10	J1/J2/J3/J8	900/900/1080/900
P141	0.30	F33	R10	J1/J2/J3/J8	900/900/1080/900
P142	0.30	F33	R10	J1/J2/J3/J8	900/900/1080/900
P143	0.45	F33	R10	J1/J2/J3/J8	900/900/1080/900
P144	0.15	F33	R10	J1/J2/J3/J8	900/900/1080/900
P145	0.15	F33	R10	J1/J2/J3/J8	900/900/1080/900
P146	0.30	F34	R10	J1/J2/J3/J8	900/900/1080/900
P147	0.30	F34	R10	J1/J2/J3/J8	900/900/1080/900
P148	0.15	F34	R10	J1/J2/J3/J8	900/900/1080/900
P149	0.30	F35	R10	J1/J2/J3/J8	900/900/1080/900
P150	0.30	F35	R10	J1/J2/J3/J8	900/900/1080/900
P151	0.45	F35	R10	J1/J2/J3/J8	900/900/1080/900
P152	0.15	F35	R10	J1/J2/J3/J8	900/900/1080/900

**Table S7.** (Continued)

Product	Weight (kg)	Family	Recipe	Line	Packing rate (kg/h)
P153	0.15	F36	R11	J1/J2/J3/J8	900/900/1080/900
P154	0.34	F36	R11	J1/J2/J3/J8	1020/1020/1224/1020
P155	0.34	F36	R11	J1/J2/J3/J8	1020/1020/2448/1020
P156	0.40	F37	R12	J1/J2/J8	1200
P157	0.20	F37	R12	J1/J2/J8	1200
P158	0.30	F37	R12	J1/J2/J8	900
P159	0.51	F38	R13	J1/J2/J3/J8	1020/1020/1224/1020
P160	0.17	F38	R13	J1/J2/J3/J8	1020/1020/1224/1020
P161	0.15	F38	R13	J1/J2/J3/J8	900/900/1080/900
P162	0.51	F38	R13	J1/J2/J3/J8	1020/1020/1224/1020
P163	0.15	F39	R14	J1/J2/J3/J8	900/900/1080/900
P164	0.15	F39	R14	J1/J2/J3/J8	900/900/1080/900
P165	0.15	F39	R14	J1/J2/J3/J8	900/900/1080/900
P166	0.15	F39	R14	J1/J2/J3/J8	900/900/1080/900
P167	0.15	F39	R14	J1/J2/J3/J8	900/900/1080/900
P168	0.15	F39	R14	J1/J2/J3/J8	900/900/1080/900
P169	0.51	F39	R14	J1/J2/J3/J8	1020/1020/1224/1020
P170	0.34	F39	R14	J1/J2/J3/J8	1020/1020/1224/1020
P171	0.15	F39	R14	J1/J2/J3/J8	900/900/1080/900
P172	0.15	F39	R14	J1/J2/J3/J8	900/900/1080/900
P173	0.34	F39	R14	J1/J2/J3/J8	2040/2040/1224/2040
P174	0.20	F40	R15	J1/J2/J8	1200
P175	0.51	F41	R16	J1/J2/J8	1020
P176	0.51	F41	R16	J1/J2/J8	1020

**Table S8.** Product demand for cases of the TYRAS facility.

	Day						
	1	2	3	4	5	6	7
P01		6263					241
P02							
P03							
P04	512						
P05				253		3257	
P06			449				
P07			428				
P08				3315			
P09			448				
P10							1351
P11			395				2135
P12		2053					
P13					1281		

**Table S8.** *(Continued)*

	Day						
	1	2	3	4	5	6	7
P14							
P15					601		
P16							
P17			553				
P18							
P19						487	
P20							
P21		421					
P22		655					
P23		4155					
P24	1427			4728			
P25							
P26				405	497		
P27							
P28	1031						211
P29							3055
P30							244
P31			3175				
P32							
P33							435
P34						642	650
P35							1611
P36				389			
P37							
P38	1057						1623
P39							
P40							
P41							802
P42				437			
P43				2760			
P44							5108
P45							
P46				282			
P47				451			
P48	4572						
P49	5080						
P50				432			
P51							
P52					467		
P53	1871				2704		
P54							

**Table S8.** *(Continued)*

	Day						
	1	2	3	4	5	6	7
P55				468			
P56				301			
P57				514			
P58				5724			
P59					13354		
P60				341			
P61				272			
P62							
P63				127			
P64				277			
P65							
P66							
P67							
P68							
P69			3175	2826			
P70				10183			
P71							
P72							
P73		619					
P74	9756	640					
P75				5455		21563	
P76	2765						
P77							
P78		380					
P79		160					
P80							
P81					338		
P82				3418			
P83							
P84							
P85			25722				
P86			670				
P87					4357		11251
P88						12137	
P89						5103	
P90							
P91					345		
P92							
P93			2630				
P94				1859	435		
P95			1792				

**Table S8.** *(Continued)*

	Day						
	1	2	3	4	5	6	7
P96				394			
P97	296						
P98							
P99			463				
P100			1821				
P101			500				
P102							
P103			69				
P104							
P105			490				
P106							
P107							
P108							
P109			1064	856			
P110		1766					
P111	3630						6785
P112	638	429	719				
P113	6221						2555
P114							
P115				329			
P116				701			
P117		6661		2762			
P118		847					
P119		1320					
P120				927			
P121			62	98			
P122							11050
P123					5615		
P124							
P125		341					215
P126							
P127							
P128		822					
P129							
P130						2444	
P131							
P132				2289			
P133							
P134			3236				
P135				328			
P136					531	179	

**Table S8.** *(Continued)*

	Day						
	1	2	3	4	5	6	7
P137							
P138					405		
P139							
P140							
P141							
P142					578		
P143							
P144			523				
P145							
P146							
P147					532		
P148			450				
P149					349		
P150							
P151							
P152			306				
P153							
P154					463		
P155					1027		
P156		3986					
P157							640
P158						2642	
P159							
P160						1323	
P161							
P162							
P163							
P164							
P165		981					
P166		1042					
P167							
P168		325					
P169		5948					
P170							
P171		5384			10228		
P172							
P173							
P174							1417
P175							
P176		2826					

**Table S9.** Changeover times data for cases of the TYRAS facility.

Line	Family	Family																				
		F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19	F20	F21
J1/J2/J3	F1	0.00	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.33	2.00	0.33	0.00	0.00	0.17	2.00	0.00	0.17	0.00	0.17	0.00	0.00
J4	F2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00
J1/J2/J3	F3	0.50	0.00	0.00	0.33	0.33	0.33	0.33	0.33	0.33	2.00	0.33	0.00	0.00	0.50	2.00	0.00	0.50	0.00	0.50	0.00	0.00
J1/J2/J3	F4	0.50	0.00	- *	0.00	0.33	0.33	0.33	0.33	0.33	2.00	0.33	0.00	0.00	0.50	2.00	0.00	0.50	0.00	0.50	0.00	0.00
J1/J2/J3	F5	0.50	0.00	-	-	0.00	0.33	0.33	0.33	0.33	2.00	0.33	0.00	0.00	0.50	2.00	0.00	0.50	0.00	0.50	0.00	0.00
J1/J2/J3	F6	0.50	0.00	-	-	-	0.00	-	0.33	-	2.00	0.33	0.00	0.00	0.50	2.00	0.00	0.50	0.00	0.50	0.00	0.00
J1/J2/J3	F7	0.50	0.00	-	-	0.33	0.33	0.00	0.33	0.33	2.00	0.33	0.00	0.00	0.50	2.00	0.00	0.50	0.00	0.50	0.00	0.00
J1/J2/J3	F8	0.50	0.00	-	-	0.33	0.33	0.33	0.00	0.33	2.00	0.33	0.00	0.00	0.50	2.00	0.00	0.50	0.00	0.50	0.00	0.00
J1/J2/J3	F9	0.50	0.00	-	-	0.33	0.33	0.33	0.33	0.00	2.00	0.33	0.00	0.00	0.50	2.00	0.00	0.50	0.00	0.50	0.00	0.00
J2	F10	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	0.00	0.00	2.00	0.17	2.00	2.00	2.00	2.00	0.00	0.00
J2/J3	F11	0.50	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.33	2.00	0.00	0.00	0.00	0.50	2.00	0.00	0.50	0.00	0.50	0.00	0.00
J6	F12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00
J4	F13	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00
J1/J2/J3	F14	0.17	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.33	2.00	0.33	0.00	0.00	0.00	2.00	0.00	0.17	0.00	0.17	0.00	0.00
J2	F15	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.17	2.00	0.00	0.00	2.00	0.00	2.00	2.00	2.00	2.00	0.00	0.00
J6	F16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J1/J2/J3	F17	0.17	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.33	2.00	0.33	0.00	0.00	0.17	2.00	0.00	0.00	0.00	0.17	0.00	0.00
J5	F18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17
J1/J2/J3	F19	0.17	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.33	2.00	0.33	0.00	0.00	0.17	2.00	0.00	0.17	0.00	0.00	0.00	0.00
J4	F20	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J5	F21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00

\* (-) impossible changeover



Table S9. (Continued)

Line	Family	Family																				
		F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19	F20	F21
J4	F22	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00
J5	F23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.25
J1/J2/J3	F24	0.25	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.33	2.00	0.33	0.00	0.00	0.25	2.00	0.00	0.25	0.00	0.25	0.00	0.00
J1/J2	F25	0.25	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.33	2.00	0.33	0.00	0.00	0.25	2.00	0.00	0.25	0.00	0.25	0.00	0.00
J1/J2/J3	F26	0.25	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.33	2.00	0.33	0.00	0.00	0.25	2.00	0.00	0.25	0.00	0.25	0.00	0.00
J7	F27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J7	F28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J7	F29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J7	F30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J7	F31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J1/J2/J3	F32	0.25	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.33	2.00	0.33	0.00	0.00	0.25	2.00	0.00	0.25	0.00	0.25	0.00	0.00
J1/J2/J3	F33	0.50	0.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	2.00	0.50	0.00	0.00	0.50	2.00	0.00	0.50	0.00	0.50	0.00	0.00
J1/J2/J3	F34	0.50	0.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	2.00	0.50	0.00	0.00	0.50	2.00	0.00	0.50	0.00	0.50	0.00	0.00
J1/J2/J3	F35	- *	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J1/J2/J3	F36	0.25	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.33	2.00	0.33	0.00	0.00	0.25	2.00	0.00	0.25	0.00	0.25	0.00	0.00
J1/J2	F37	0.25	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.33	2.00	0.33	0.00	0.00	0.25	2.00	0.00	0.25	0.00	0.25	0.00	0.00
J1/J2/J3	F38	0.25	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.33	2.00	0.33	0.00	0.00	0.25	2.00	0.00	0.25	0.00	0.25	0.00	0.00
J1/J2/J3	F39	0.25	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.33	2.00	0.33	0.00	0.00	0.25	2.00	0.00	0.25	0.00	0.25	0.00	0.00
J1/J2	F40	0.25	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.33	2.00	0.33	0.00	0.00	0.25	2.00	0.00	0.25	0.00	0.25	0.00	0.00
J1/J2	F41	0.25	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.33	2.00	0.33	0.00	0.00	0.25	2.00	0.00	0.25	0.00	0.25	0.00	0.00

\* (-) impossible changeover

Table S9. (Continued)

Line	Family	Family																			
		F22	F23	F24	F25	F26	F27	F28	F29	F30	F31	F32	F33	F34	F35	F36	F37	F38	F39	F40	F41
J1/J2/J3	F1	0.00	0.00	0.25	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.33	0.33	0.33	0.25	0.25	0.25	- *	0.25	0.25
J4	F2	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00
J1/J2/J3	F3	0.00	0.00	0.50	0.50	0.50	0.00	0.00	0.00	0.00	0.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-	0.50	0.50
J1/J2/J3	F4	0.00	0.00	0.50	0.50	0.50	0.00	0.00	0.00	0.00	0.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-	0.50	0.50
J1/J2/J3	F5	0.00	0.00	0.50	0.50	0.50	0.00	0.00	0.00	0.00	0.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-	0.50	0.50
J1/J2/J3	F6	0.00	0.00	0.50	0.50	0.50	0.00	0.00	0.00	0.00	0.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-	0.50	0.50
J1/J2/J3	F7	0.00	0.00	0.50	0.50	0.50	0.00	0.00	0.00	0.00	0.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-	0.50	0.50
J1/J2/J3	F8	0.00	0.00	0.50	0.50	0.50	0.00	0.00	0.00	0.00	0.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-	0.50	0.50
J1/J2/J3	F9	0.00	0.00	0.50	0.50	0.50	0.00	0.00	0.00	0.00	0.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-	0.50	0.50
J2	F10	0.00	0.00	2.00	2.00	2.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	-	2.00	2.00
J2/J3	F11	0.00	0.00	0.50	0.50	0.50	0.00	0.00	0.00	0.00	0.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-	0.50	0.50
J6	F12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00
J4	F13	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00
J1/J2/J3	F14	0.00	0.00	0.25	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.33	0.33	0.33	0.25	0.25	0.25	-	0.25	0.25
J2	F15	0.00	0.00	2.00	2.00	2.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	-	2.00	2.00
J6	F16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00
J1/J2/J3	F17	0.00	0.00	0.25	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.33	0.33	0.33	0.25	0.25	0.25	-	0.25	0.25
J5	F18	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00
J1/J2/J3	F19	0.00	0.00	0.25	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.33	0.33	0.33	0.25	0.25	0.25	-	0.25	0.25
J4	F20	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00
J5	F21	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00

\* (-) impossible changeover

Table S9. (Continued)

Line	Family	Family																			
		F22	F23	F24	F25	F26	F27	F28	F29	F30	F31	F32	F33	F34	F35	F36	F37	F38	F39	F40	F41
J4	F22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	- *	0.00	0.00
J5	F23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00
J1/J2/J3	F24	0.00	0.00	0.00	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.33	0.33	0.33	0.25	0.25	0.25	-	0.25	0.25
J1/J2	F25	0.00	0.00	0.25	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.33	0.33	0.33	0.25	0.25	0.25	-	0.25	0.25
J1/J2/J3	F26	0.00	0.00	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.33	0.33	0.33	0.25	0.25	0.25	-	0.25	0.25
J7	F27	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.42	0.42	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00
J7	F28	0.00	0.00	0.00	0.00	0.00	0.42	0.00	0.42	0.42	-	0.00	0.00	0.00	0.00	0.00	-	0.00	-	0.00	0.00
J7	F29	0.00	0.00	0.00	0.00	0.00	-	-	0.00	0.42	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00
J7	F30	0.00	0.00	0.00	0.00	0.00	-	-	-	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00
J7	F31	0.00	0.00	0.00	0.00	0.00	0.42	0.42	0.42	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00
J1/J2/J3	F32	0.00	0.00	0.25	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.33	0.33	0.25	0.25	0.25	-	0.25	0.25
J1/J2/J3	F33	0.00	0.00	0.50	0.50	0.50	0.00	0.00	0.00	0.00	0.00	-	0.00	-	0.33	0.50	0.50	0.50	-	0.50	0.50
J1/J2/J3	F34	0.00	0.00	0.50	0.50	0.50	0.00	0.00	0.00	0.00	0.00	-	0.33	0.00	0.33	0.50	0.50	0.50	-	0.50	0.50
J1/J2/J3	F35	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-
J1/J2/J3	F36	0.00	0.00	0.25	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.33	0.33	0.33	0.00	0.25	0.25	-	0.25	0.25
J1/J2	F37	0.00	0.00	0.25	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.33	0.33	0.33	0.33	0.00	0.25	-	0.25	0.25
J1/J2/J3	F38	0.00	0.00	0.25	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.33	0.33	0.33	0.33	0.25	0.00	-	0.25	0.25
J1/J2/J3	F39	0.00	0.00	0.25	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.33	0.33	0.33	0.33	0.25	0.25	0.00	0.25	0.25
J1/J2	F40	0.00	0.00	0.25	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.33	0.33	0.33	0.33	0.25	0.25	-	0.00	0.25
J1/J2	F41	0.00	0.00	0.25	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.33	0.33	0.33	0.33	0.25	0.25	-	0.25	0.00

\* (-) impossible changeover