

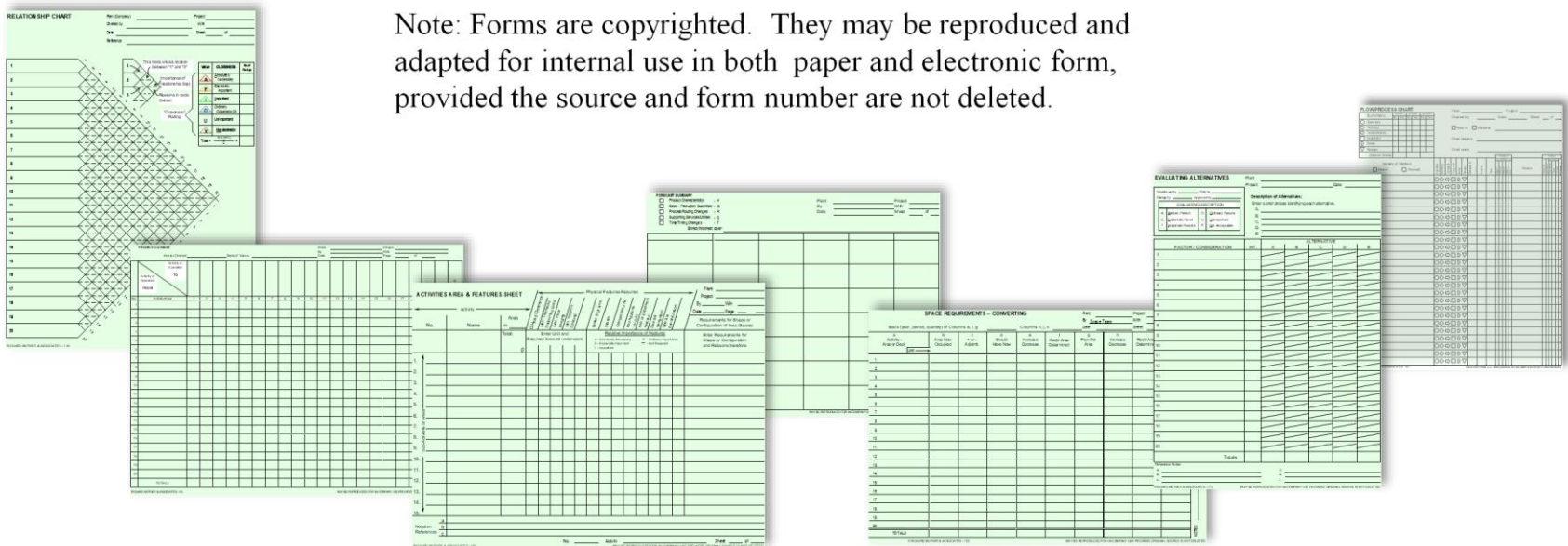
# How to Lay Out a Warehouse or Distribution Center

## Working Forms

available in Excel from

[www.RichardMuther.com](http://www.RichardMuther.com)

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# RELATIONSHIP CHART

Plant (Company) \_\_\_\_\_

Project \_\_\_\_\_

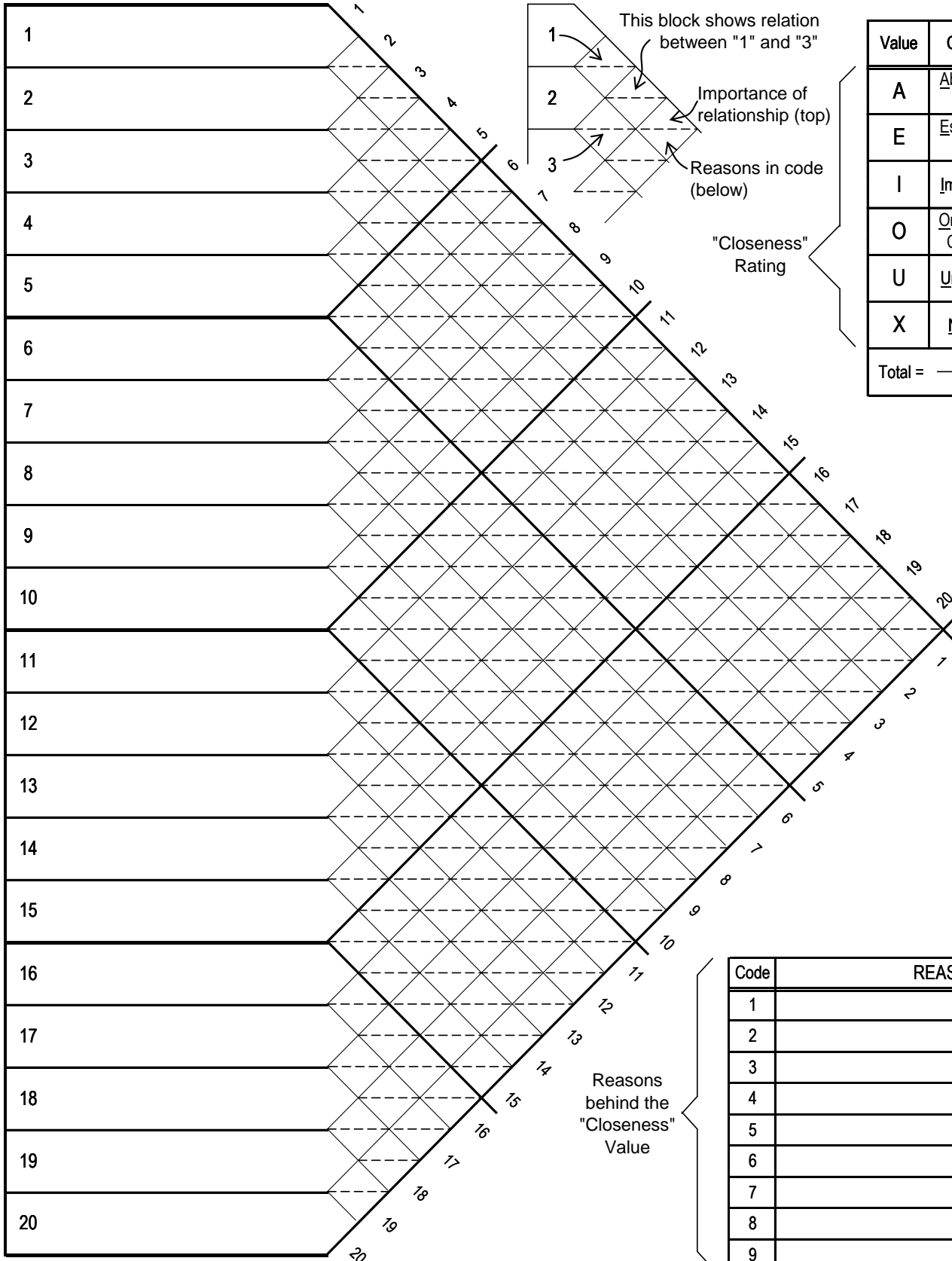
Charted by \_\_\_\_\_

With \_\_\_\_\_

Date \_\_\_\_\_

Sheet \_\_\_\_\_ of \_\_\_\_\_

Reference \_\_\_\_\_



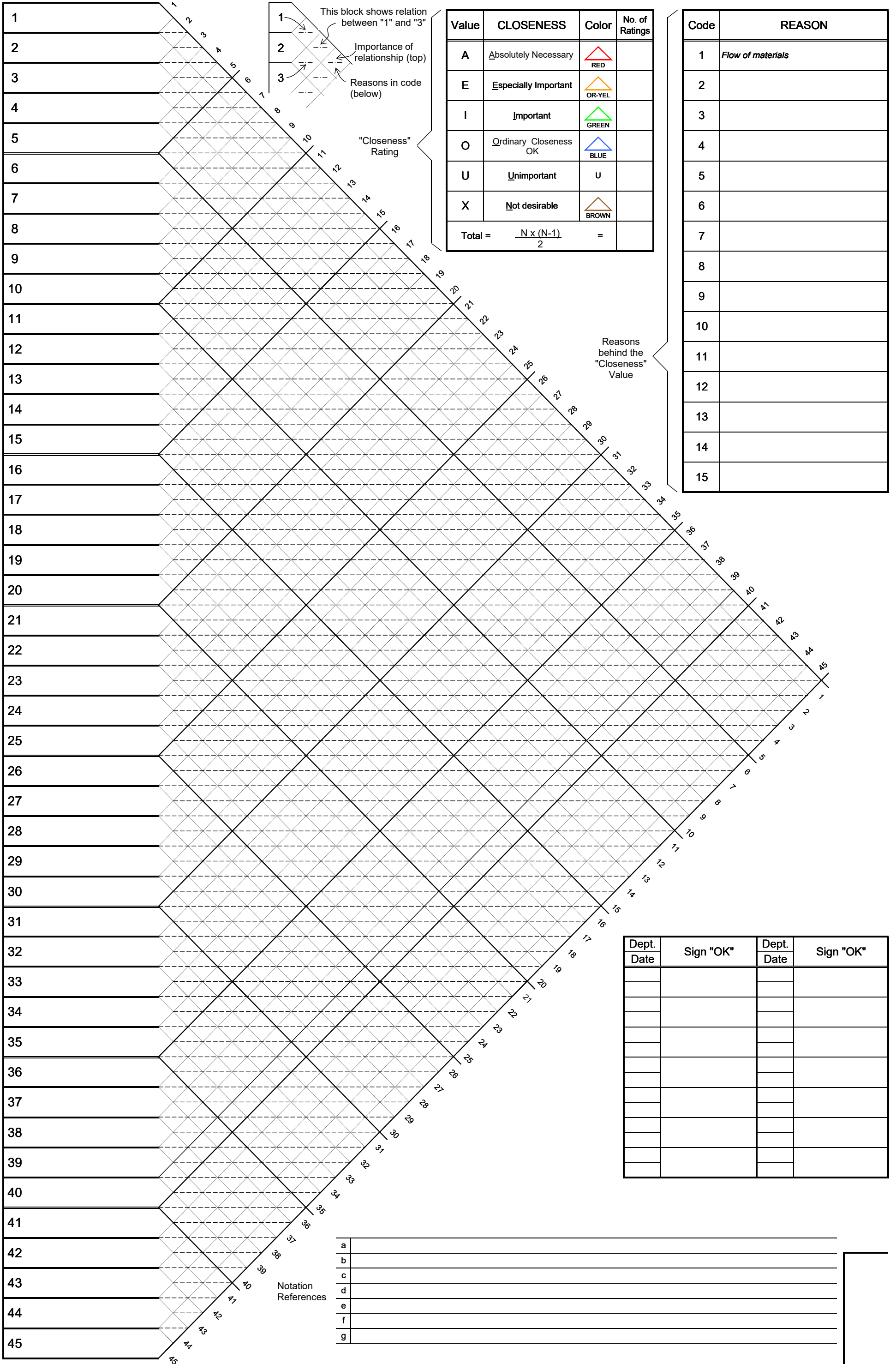
Value	CLOSENESS	No. of Ratings
A	Absolutely Necessary	
E	Especially Important	
I	Important	
O	Ordinary Closeness OK	
U	Unimportant	
X	Not desirable	
Total = $\frac{N \times (N-1)}{2}$ =		

Code	REASON
1	
2	
3	
4	
5	
6	
7	
8	
9	

Reasons behind the "Closeness" Value

# RELATIONSHIP CHART

Plant (Company) \_\_\_\_\_ Project \_\_\_\_\_  
 Source - Reference \_\_\_\_\_ Date \_\_\_\_\_ Charted by \_\_\_\_\_



**FROM-TO-CHART**

Item(s) Charted: \_\_\_\_\_

Basis of Values: \_\_\_\_\_

Plant \_\_\_\_\_  
 By \_\_\_\_\_  
 Date \_\_\_\_\_

Project \_\_\_\_\_  
 With \_\_\_\_\_  
 Page \_\_\_\_\_ of \_\_\_\_\_

Activity or Operation TO  Activity or Operation FROM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL		
	1																						
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							
13																							
14																							
15																							
16																							
17																							
18																							
19																							
20																							
<b>TOTALS</b>																							

NOTES:



# ACTIVITIES AREA & FEATURES SHEET

Plant \_\_\_\_\_  
 Project \_\_\_\_\_  
 By \_\_\_\_\_ With \_\_\_\_\_  
 Date \_\_\_\_\_ Page \_\_\_\_\_ of \_\_\_\_\_

No.	Name	Area in _____	Physical Features Required												Requirements for Shape or Configuration of Area (Space)
			O'Head Clearance	Max. Overhead Supported Load	Max. Floor Loading	Min. Column Spacing	Water & Drains	Steam	Compressed Air	Foundations - or Pits	Fire or Explosion Hazard	Special Ventilation	Special Electrification		
Total:			Enter Unit and Required Amount under each				Relative Importance of Features						Enter Requirements for Shape or Configuration <u>and</u> Reasons therefore		
							A - Absolutely Necessary      O - Ordinary Importance E - Especially Important      - - Not Required I - Important								
1.															
2.															
3.															
4.															
5.															
6.															
7.															
8.															
9.															
10.															
11.															
12.															
13.															
14.															
15.															

Notation References

a	
b	
c	

## SPACE REQUIREMENTS -- CONVERTING

Plant \_\_\_\_\_ Project \_\_\_\_\_  
 By \_\_\_\_\_ With \_\_\_\_\_  
 Date \_\_\_\_\_ Sheet \_\_\_\_\_ of \_\_\_\_\_

Basis (year, period, quantity) of Columns e, f, g \_\_\_\_\_

Columns h, j, k \_\_\_\_\_

a Activity-- Area or Dept.	b Area Now Occupied	c + or - Adjstmt.	d Should Have Now	e Increase Decrease	f Req'd Area Determined	g Plan-For Area	h Increase Decrease	j Req'd Area Determined	k Plan-For Area
Unit →									
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									
19.									
20.									
<b>TOTALS</b>									

NOTES:

**WAREHOUSE SPACE  
CONVERSION WORKSHEET**

Plant \_\_\_\_\_  
By \_\_\_\_\_  
Date \_\_\_\_\_

Project \_\_\_\_\_  
With \_\_\_\_\_  
Sheet \_\_\_\_\_ of \_\_\_\_\_

#	Material Storage Group or Area	Unit of Measure	Present Capacity	+ or - Adjust.	Should Have Now	Volume Index	Turns Undex	Variety Index	Storage Index	Product Index	Max Index	Total Index	Planning Horizon (5-year) Reqmt.



# EVALUATING ALTERNATIVES

Plant \_\_\_\_\_  
 Project \_\_\_\_\_ Date \_\_\_\_\_

Weights set by \_\_\_\_\_ Tally by \_\_\_\_\_  
 Ratings by \_\_\_\_\_ Approved by \_\_\_\_\_

EVALUATING DESCRIPTION			
A	Almost Perfect	O	Ordinary Results
E	Especially Good	U	Unimportant
I	Important Results	X	Not Acceptable

### Description of Alternatives:

Enter a brief phrase identifying each alternative.

- A. \_\_\_\_\_
- B. \_\_\_\_\_
- C. \_\_\_\_\_
- D. \_\_\_\_\_
- E. \_\_\_\_\_

FACTOR / CONSIDERATION	WT.	RATINGS AND WEIGHTED RATINGS				
		A	B	C	D	E
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
<b>Totals</b>						

Reference Notes:

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_
- e. \_\_\_\_\_
- f. \_\_\_\_\_

# MATERIAL CHARACTERISTICS

Plant \_\_\_\_\_ Project \_\_\_\_\_  
 By \_\_\_\_\_ With \_\_\_\_\_  
 Date \_\_\_\_\_ Sheet \_\_\_\_\_ of \_\_\_\_\_

PRODUCT-MATERIAL DESCRIPTION (ITEM OR ITEM-GROUP)	Smallest Practical Unit of Item -- (Unit to be Classified)	PHYSICAL CHARACTERISTICS OF UNIT*						OTHER CHARACTERISTICS*			CLASSIFICATION	
		SIZE in _____ If item is liquid, gas, or loose-or-bulk solid(s), note it in these columns.			WEIGHT in _____	SHAPE	RISK OF DAMAGE (Danger to Material, Men, and/or Facilities)	CONDITION (Temperature, Stability, Rigidity, Messy, etc.)	QUANTITY (VOLUME) and/or Lot-Size Characteristics	TIMING (Regularity, Seasonality, Urgency)		SPECIAL CONTROL (Extraordinary or Control Characteristics)
		Length	Width	Height								
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

NOTES: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

\* Governing Characteristics Rating:  
 Red -- Absolutely Governs the Classification.  
 \_\_\_\_\_ Orange-Yellow -- Especially Important Influence.  
 \_\_\_\_\_

**MATERIAL CLASSIFICATION SUMMARY**

Plant \_\_\_\_\_ Project \_\_\_\_\_  
 By \_\_\_\_\_ With \_\_\_\_\_  
 Date \_\_\_\_\_ Sheet \_\_\_\_\_ of \_\_\_\_\_

MATERIAL CLASS		CLASSIFICATION CRITERIA		TYPICAL EXAMPLES
Description	Class Identif.	Physical Characteristics (Size, Weight, Shape, Risk, Condition)	Other Characteristics (Quantity, Timing, Special Control)	
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

Notes: \_\_\_\_\_

# ROUTE-PRODUCT MOVEMENT SUMMARY

Plant \_\_\_\_\_ Project \_\_\_\_\_  
 By \_\_\_\_\_ With \_\_\_\_\_  
 Date \_\_\_\_\_ Sheet \_\_\_\_\_ Of \_\_\_\_\_

Unit of Flow in \_\_\_\_\_ per \_\_\_\_\_  
 Basis for Unit of Flow (or Conversion Values) \_\_\_\_\_

ROUTE	PRODUCT-MATERIAL															TOTAL
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
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16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
TOTAL																

**SUMMARY OF MOVES**

Plant \_\_\_\_\_ Project \_\_\_\_\_

By \_\_\_\_\_ With \_\_\_\_\_

Date \_\_\_\_\_ Sheet \_\_\_\_\_ of \_\_\_\_\_

Unit of Flow in \_\_\_\_\_ per \_\_\_\_\_

Basis for Unit of Flow (or Conversion Values) \_\_\_\_\_

ROUTE		Distance in _____	Total Intensity	PRODUCT-MATERIAL					
<input type="checkbox"/> FROM - TO <input type="checkbox"/> BOTH DIRECTIONS				Class _____	Class _____	Class _____	Class _____	Class _____	Class _____
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
<b>TOTAL</b>									

Notes \_\_\_\_\_

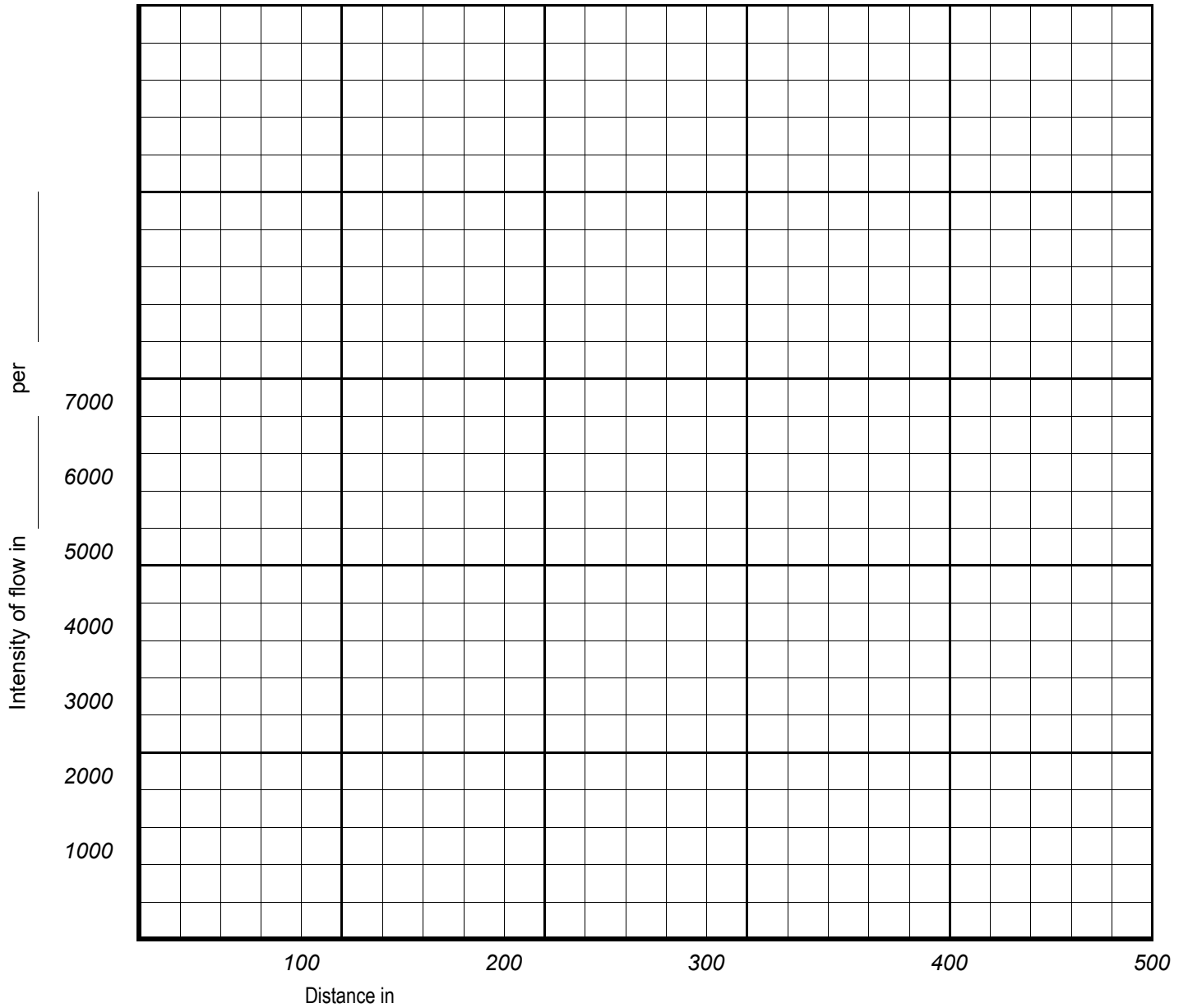
Company/Unit/Plant \_\_\_\_\_

# DISTANCE-INTENSITY PLOT

By \_\_\_\_\_ With \_\_\_\_\_

Date \_\_\_\_\_ Sheet \_\_\_\_\_ of \_\_\_\_\_

Product-Material \_\_\_\_\_  
Items or Classes \_\_\_\_\_  
plotted \_\_\_\_\_



ROUTES PLOTTED ON CHART

1	15	29
2	16	30
3	17	31
4	18	32
5	19	33
6	20	34
7	21	35
8	22	36
9	23	37
10	24	38
11	25	39
12	26	40
13	27	41
14	28	42

# INSTALLATION COST SUMMARY

Description \_\_\_\_\_

Plant \_\_\_\_\_

Project \_\_\_\_\_

Estimated by \_\_\_\_\_

With \_\_\_\_\_

Currency \_\_\_\_\_ Date \_\_\_\_\_

Sheet \_\_\_\_\_ of \_\_\_\_\_

NATURE OF WORK	Estimated		Rate/ Hour	Labor Cost	Total Cost	Outside Bid
	Material	Hours				
1 Clear and prepare new area -- including marking aisles, columns, locations.						
2 Building repairs, alterations, or construction.						
3 Paint new areas, before and after move.						
4 Clean-up and repair machines and equipment now in storage.						
5						
6 Disconnect utilities -- electric, water, air, gas, etc.						
7 Disconnect auxiliaries -- vents, drains, ducts, conveyors, other handling equipment, etc.						
8 Move out operating machines and equipment.						
9 Move out all service and miscellaneous equipment.						
10 Move out materials, work-in-process, stores, tools, supplies.						
11 Remove operating machines and equipment not to be relocated.						
12 Remove service and miscellaneous equipment not to be relocated.						
13 Prepare non-movers for storage, sale, or other disposition.						
14 Fill-in pits, close holes, and clean-up old area.						
15						
16 Install pits, foundations, openings, special enclosures.						
17 Install conveyors, hoists, other handling equipment, racks, shelving, storage equipment.						
18 Install electric power equipment, leads, outlets, lighting fixtures, etc.						
19 Install utility lines and outlets -- water, air, gas -- drains and sewers,						
20 Install heating, ventilating, air conditioning, ducts, fans, filters, dust collectors, etc.						
21 Move operating machines -- spot, level, lag, mount						
22 Move in all service and miscellaneous equipment (not already installed).						
23 Move in all materials, work-in-process, stores, tools.						
24 Hook-up or connect, straighten-up, try out prior to operating.						
25						
<b>Total</b>						

NOTES: \_\_\_\_\_

# INSTALLATION COORDINATION WORKSHEET

Plant (Company) \_\_\_\_\_ Project \_\_\_\_\_  
 By \_\_\_\_\_ With \_\_\_\_\_  
 Date Originated \_\_\_\_\_ Sheet \_\_\_\_\_ of \_\_\_\_\_  
 Date of this review \_\_\_\_\_

		WHAT	WHO	WHEN	STATUS	As of (date)
<b>MAKE READY</b>	<b>PLAN</b>	1. Start planning the installation				
		2. Establish sequence and timing of moves				
		3. Inventory materials and equipment to move				
		4. Get disposition of non-moving material and equipment				
		5. Schedule moves in detail				
		6. Assign move numbers; check vs inventory & equipment (tag) number				
		7. Verify procedural changes and timing				
		8.				
	<b>PROVIDE</b>	1. Decide who will make moves				
		2. Secure bids as necessary				
		3. Determine and reserve moving equipment required				
		4. Set up communications for both ends of move				
		5. Appoint key person for each area				
		6. Get work order(s) for moves				
		7. Verify delivery for any new equipment				
		8.				
	<b>PREPARE</b>	1. Prepare new locations -- physical area, conditions, auxiliaries				
		2. Broadcast plans				
		3. Brief personnel specifically involved				
		4. Mark everything to move; identification, move no., destination				
		5. Disconnect or ready equipment				
		6. Check out equipment and release to movers				
		7. Complete required training				
		8.				
<b>DO</b>	<b>INSTALL</b>	1. Move equipment intact to reduce re-assembly time				
		2. Move close to spot to reduce line-up and hook-up time				
		3. Post move performance as accomplished				
		4. Keep moving crew informed, coordinated				
		5. Be on hand -- layout interpretation				
		6. Be on hand -- auxiliaries interpretation				
		7. Be on hand -- procedures interpretation				
		8.				
<b>PUT AWAY</b>	<b>HOOK-UP</b>	1. Spot equipment; check location				
		2. Temporary hook-ups where needed				
		3. Check and release for permanent connections				
		4. Inspect the installation & release for tryout				
		5. Maintenance tryout				
		6. Release to operating group; secure acceptance				
		7.				
		8.				
	<b>CLEAN-UP</b>	1. Survey-inspect old and new areas				
		2. Schedule & assign clean-up -- old and new areas				
		3. Verify layout as installed				
		4. Verify auxiliary service as installed				
		5. Verify or adjust layout & service-specification records				
		6. Recap installation costs and performance				
		7. Final sign-off by operating group				
		8.				

Reference Notes:

- a. \_\_\_\_\_ c. \_\_\_\_\_  
 b. \_\_\_\_\_ d. \_\_\_\_\_



# INSTALLATION INSTRUCTIONS SUMMARY

Description \_\_\_\_\_

Plant \_\_\_\_\_ Project \_\_\_\_\_

By \_\_\_\_\_ With \_\_\_\_\_

Date \_\_\_\_\_ Sheet \_\_\_\_\_ of \_\_\_\_\_

ITEM No.	DESCRIPTION  MACH./EQPT. No.	MOVE	UTILITIES					MILLWRIGHTS-MECHANICAL	ELECTRICAL					ELECTRICIANS	OTHER WORK -- (Code who and describe)		
			Air	Water	Gas	Drain	Vent		Steam	Volts	Phase	KVA	Amps		H.P.	WHO	WHAT

To accompany Drwg. Nos.

Work Order

# INSTALLATION RECORD

Mach. or Eqpt. No.   
 Mach. /Eqpt. Type \_\_\_\_\_  
 Mfr. \_\_\_\_\_  
 Size/Model \_\_\_\_\_  
 Signif. Identification \_\_\_\_\_

Plant \_\_\_\_\_ Project \_\_\_\_\_  
 Bldg. \_\_\_\_\_ Area \_\_\_\_\_ Dept. \_\_\_\_\_  
 Nearest Column Location \_\_\_\_\_  
 Sheet issued by\* \_\_\_\_\_  
 Date issued \_\_\_\_\_ Date returned \_\_\_\_\_

**MECHANICAL, MAINTENANCE, MILLWRIGHTS**

Level _____	Resp. _____	Due _____	Complete (sign) _____
			Date _____
Lag _____	Resp. _____	Due _____	Comments _____
Mount _____	Resp. _____	Due _____	_____
_____	Resp. _____	Due _____	_____

**ELECTRICIANS**

Power _____	Resp. _____	Due _____	Complete (sign) _____
			Date _____
Control _____	Resp. _____	Due _____	Comments _____
Lights _____	Resp. _____	Due _____	_____
_____	Resp. _____	Due _____	_____

**PIPING & SHEET METAL**

Water _____	Resp. _____	Due _____	Complete (sign) _____
			Date _____
Steam _____	Resp. _____	Due _____	Comments _____
Drains _____	Resp. _____	Due _____	_____
Comp. Air _____	Resp. _____	Due _____	_____
Gas _____	Resp. _____	Due _____	_____
Coolant, Lube _____	Resp. _____	Due _____	_____
Hoods, Ducts, Fans _____	Resp. _____	Due _____	_____
_____	Resp. _____	Due _____	_____

**PAINT and CLEAN-UP**

Paint _____	Resp. _____	Due _____	Complete (sign) _____
			Date _____
Clean-Up _____	Resp. _____	Due _____	Comments _____
_____	Resp. _____	Due _____	_____

**SAFETY**

Guards _____	Resp. _____	Due _____	Complete (sign) _____
			Date _____
Fire Regs. _____	Resp. _____	Due _____	Comments _____
Fumes, Acids _____	Resp. _____	Due _____	_____
_____	Resp. _____	Due _____	_____

**OTHER INSTALLATION WORK SIGN-OFF**

_____	Resp. _____	Due _____	Complete (sign) _____
			Date _____
_____	Resp. _____	Due _____	Comments _____
_____	Resp. _____	Due _____	_____
_____	Resp. _____	Due _____	_____

**FINAL ACCEPTANCE (by installation coordinator or operating supervision)**

Name _____	Title _____	Sign _____	Date _____
Comment _____			
Name _____	Title _____	Sign _____	Date _____
Comment _____			

(After final acceptance, return this sheet to person originally issuing it. See above.)

NOTES, Special Instructions, Reasons for Delay \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

\* Return this sheet to person originally issuing it, after final acceptance

**FORECAST SUMMARY**

- Product Characteristics - P
- Sales - Production Quantities - Q
- Process/Routing Changes - R
- Supporting Services/Utilities - S
- Time/Timing Changes - T

Plant \_\_\_\_\_ Project \_\_\_\_\_  
 By \_\_\_\_\_ With \_\_\_\_\_  
 Date \_\_\_\_\_ Sheet \_\_\_\_\_ of \_\_\_\_\_

Entries this sheet cover: \_\_\_\_\_


# FLOW PROCESS CHART

Plant \_\_\_\_\_ Project \_\_\_\_\_

Charted by \_\_\_\_\_ Date \_\_\_\_\_ Sheet \_\_\_\_\_ of \_\_\_\_\_

Man or  Material \_\_\_\_\_

Chart begins \_\_\_\_\_

Chart ends \_\_\_\_\_

Summary	Present		Proposed		Difference	
	No.	Time	No.	Time	No.	Time
○ Operations						
◇ Handlings						
⇒ Transportations						
□ Inspections						
D Delays						
▽ Storages						
Distance Traveled						

Details of Method <input type="checkbox"/> Present <input type="checkbox"/> Proposed	Operation	Handling	Transport	Inspection	Delay	Storage	Distance in	Quantity	Time	Analysis Why?				Notes	Action Change							
										What?	Where?	When?	Who?		How?	Eliminate	Combine	Sequence	Place	Person	Improve	
1.	○	◇	⇒	□	D	▽																
2.	○	◇	⇒	□	D	▽																
3.	○	◇	⇒	□	D	▽																
4.	○	◇	⇒	□	D	▽																
5.	○	◇	⇒	□	D	▽																
6.	○	◇	⇒	□	D	▽																
7.	○	◇	⇒	□	D	▽																
8.	○	◇	⇒	□	D	▽																
9.	○	◇	⇒	□	D	▽																
10.	○	◇	⇒	□	D	▽																
11.	○	◇	⇒	□	D	▽																
12.	○	◇	⇒	□	D	▽																
13.	○	◇	⇒	□	D	▽																
14.	○	◇	⇒	□	D	▽																
15.	○	◇	⇒	□	D	▽																
16.	○	◇	⇒	□	D	▽																
17.	○	◇	⇒	□	D	▽																
18.	○	◇	⇒	□	D	▽																
19.	○	◇	⇒	□	D	▽																
20.	○	◇	⇒	□	D	▽																
21.	○	◇	⇒	□	D	▽																
22.	○	◇	⇒	□	D	▽																
23.	○	◇	⇒	□	D	▽																
24.	○	◇	⇒	□	D	▽																
25.	○	◇	⇒	□	D	▽																

# PROJECT SCHEDULE SHEET

Covering \_\_\_\_\_ Status as of \_\_\_\_\_  
 Distribution \_\_\_\_\_

Originating Department \_\_\_\_\_  
 Prepared by \_\_\_\_\_  
 Date \_\_\_\_\_ Sheet \_\_\_\_\_ of \_\_\_\_\_

Task/Proj. No. and/or Description	Resp. of	Gantt Chart												Further Schedule	
		Work to do; Action to take													
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															

Gantt Chart Code:  Date work scheduled to start  Date work scheduled to finish  Total time scheduled for work  Amount of work done

(Each vertical period represents one unit of time. Use Gantt Chart Code or enter numbers and/or other indicators.)

# COORDINATION AND PROGRESS SUMMARY

Covering \_\_\_\_\_ Status as of \_\_\_\_\_ Originating Department \_\_\_\_\_  
 Distribution \_\_\_\_\_ Reported by \_\_\_\_\_ Prepared by \_\_\_\_\_  
 Date \_\_\_\_\_ Sheet \_\_\_\_\_

Task/Project. No. and/or Description	Resp. Dept.	Status Code	Status & Remarks
Work to do; Action to be taken			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

Status Code:

0, Not yet begun; 1, Preliminaries underway; 2, Prelim. Complete & work in process; 3, Well along; 4, Almost done; Compl., Complete

NOTES:

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