







M16 PLOTTING BOARD

UNITED STATES ARMY INFANTRY SCHOOL INFANTRY MORTAR LEADER COURSE MTR CO 1ST BATTALION 19TH INFANTRY REGIMENT FT. BENNING, GEORGIA 31905 AUGUST 2021

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INTRODUCTION

For	C use of this form,	OMPU see TC 3-22	TER'SF 2.91; the pro	Ponent ager	D ncy is TRADOC					
ORGANIZATION	DA	TE		TIME	OBS	OBSERVER ID TA		TARGET NUMBER		
ADJUST FIRE FOR EFFECT	SHIFT FROM	1	-	52	POLAR				1	
MMEDIATE SUPPRESSION					OT DIRE	OT DIRECTION ALTITUDE				
	OT DIRECTION	NN			DISTANC	DISTANCE				
GRID			_		VERTICA	L INTERVA	Li i			
		•n								
					VERTICA	VERTICAL ANGLE				
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TARGET DESCRIPTION										
METHOD OF ENGAGEMENT	21				24					
FDC ORDER		INITIAL C	HART DATA	4		INITIAL FI	RE COMMAND	8	EXPENDED	
MORTAR TO FFE		N			MORTAR	TO FOLLO	w			
MORTAR TO ADJ		N CORREC	TION		SHELL A					
METHOD OF ADJ		R								
BASIS FOR CORRECTION	RANGE			MORTAR	MORTAR TO FIRE					
SHEAF CORRECTION	VI/ALT CORRECTION				METHOD	OF FIRE _			MAX ORD	
SHELL AND FUZE	- 0+	□+ □-								
	_ RANGE COF	RANGE CORRECTION					DEFLECTION			
METHOD OF FFE	+	□+ □-				CHARGE				
RANGE LATERAL SPREAD	- RANGE	CHARGE				ELEVATION				
TIME OF OPENING FIRE	AZIMUTH				TIME SET	TIME SETTING				
	ANGLE T				_	-				
OBSERVER CORRECTION CHART/SAM	ETY DATA			SUBSE	QUENT COM	IANDS			2 	
DEV RANGE TIME DEF/AZ (HEIGHT)	RANGE	MORTAR FIRE	METHOD FIRE	AIM AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV		
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		l i						8 2	1	
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BATTLE DAMAGE ASSESSMENT (BDA):		AIM PC	DINT GRID:	a - 6	3	22				

DA FORM 2399, MAY 2017

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BASIC PROCEDURES OBSERVED FIRING CHART

These are the basic procedures that are used on the M16 plotting board when in the **OBSERVED CHART.**

1. Determine the direction and distance from the mortar position to the target.

2. Index the initial direction and plot the first round over the vertical center line at the range determined.

3. Determine the Mounting Azimuth. Round Off Rule. The initial direction of fire must be rounded off to the <u>nearest 50mils</u>. 1420mils = 1400mils, 1430mils = 1450mils, 1450mils = 1450mils.

4. Superimpose the referred deflection scale directly under the Mounting Azimuth

5. Determine the deflection. Rotate disk until the plot is over the vertical centerline.

6. Determine the lowest charge. Use the charge tables. Find part 1 and turn back one page. Use the <u>Charge vs. Range Chart</u>

7. To plot the observer's corrections, index the observer's azimuth/direction and make corrections from the last plot.

8. Determine the new deflection, range, and charge. Rotate the disk until the new plot is over the vertical centerline.

Note: The observed chart is used for fast and emergency types of missions. You will not use VI, Range Corrections, or any other Corrections to change the Chart Data.

CHART DATA IS COMMAND DATA

Command Data is sent to the guns in order for them to fire.

SETUP WEAPON DATA FO DAT	Ά	
TIME OUT: FO ALT	GRID	
TGT PRFX:		
TGT NO: mm CAR: YES DIR: DIR:		
ALARM: ON OFF OIS: DIS:		
MIN E: BP:		
MIN N: WPN: WPN:		
GD: E W E: DIR: DIR:		
KEY TONE: DEE		
OWNER ID: DIS:		
TEMPERATURE TYPE: HE WP ILL CS TNG		
LOT NUMBER		
WEIGHT		
ON HAND		
RECEIVED		
TOTAL		
ROUNDS EXPENDED		
ROUNDS REMAINING		
TARGET DATA		
TARGET CHART FIRING FIRING INTELLIGENCE	ROL	INDS
TGT GRID ALT DEFL RG DEFL RANGE ALT ALT DEFL RG FUZE TIME ELEV TIME TARGET METHOD OF SURVEILLANCE CHG CORR CORR VI CORR CHG SETTING FIRED DESCRIPTION ENGAGEMENT	EXP	REM

1ST GRID MISSION

For us	C se of this form,	OMPU see TC 3-22	TER'SF 2.91; the pro	PODENT ager	D ncy is TRADO	c				
ORGANIZATION	D	ATE		TIME	OE	OBSERVER ID TARGET		TARGET N	IUMBER	
ADJUST FIRE FOR EFFECT	SHIFT FROM	М			POLAR			8 1919 - 1919 - 1919		
DIMMEDIATE SUPPRESSION					OT DIR	OT DIRECTION ALTITUDE				
	OT DIRECTIO	N			_ DISTAN	DISTANCE				
GRID					VERTIC	VERTICAL INTERVAL				
						VERTICAL ANGLE				
					+					
TARGET DESCRIPTION										
METHOD OF ENGAGEMENT					-					
FDC ORDER		INITIAL C	HART DATA	4		INITIAL FI	RE COMMAND	8	EXPENDED	
MORTAR TO FFE	DEFLECTIO	N				R TO FOLLO	w			
MORTAR TO ADJ	DEFLECTIO	N CORREC	TION		SHELL	AND FUZE				
METHOD OF ADJ		R			_					
BASIS FOR CORRECTION	RANGE					MORTAR TO FIRE				
SHEAF CORRECTION	VI/ALT CORRECTION				METHO	METHOD OF FIRE				
SHELL AND FUZE	□+ □-					—				
	RANGE CORRECTION				DEFLE	DEFLECTION				
METHOD OF FFE		□.			CHARG	CHARGE				
RANGE LATERAL SPREAD	CHARGE				ELEVAT	ELEVATION				
	AZIMUTH				TIME SE	TIME SETTING				
	ANGLE T				_					
				CLIBGE		MANDS				
DEV RANGE TIME DEF/AZ	RANGE	MORTAR	METHOD	AIM			TIME	FLEV		
(HEIGHT)		FIRE	FIRE	AZIMUTH						
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BATTLE DAMAGE ASSESSMENT (BDA):	DDL	WATE EN	TONIS ADE	AIM PC	DINT GRID:	301 T		19	100 1 0 4 00	

1ST SHIFT MISSION

For u:	C se of this form,	See TC 3-2	TER'S 2.91; the pr	PRECORE) cy is TRADO	с				
ORGANIZATION	DA	ATE		TIME	OB	SERVER ID		TARGET N	IUMBER	
ADJUST FIRE FIRE FOR EFFECT	SHIFT FROM	M			POLAR OT DIRE	CTION	A	LTITUDE		
LIMMEDIATE SUPPRESSION		N			DISTAN	DISTANCE				
					VERTIC	AL INTERVA	1			
GRID		нт								
OT DIRECTION						VERTICAL ANGLE				
ALTITUDE					+					
TARGET DESCRIPTION										
METHOD OF ENGAGEMENT										
FDC ORDER	1	INITIAL C	HART DAT	A		INITIAL FI	RE COMMAND	8	ROUNDS EXPENDED	
MORTAR TO FFE	DEFLECTIO	N				R TO FOLLO	w			
MORTAR TO ADJ	DEFLECTIO	N CORREC	TION		SHELL A	ND FUZE				
METHOD OF ADJ		R	8							
BASIS FOR CORRECTION	RANGE				MORTAR TO FIRE					
SHEAF CORRECTION	VI/ALT CORRECTION				METHOD	OF FIRE _			MAX ORD	
SHELL AND FUZE										
(2)					DEFLEC	DEFLECTION				
METHOD OF FFE	L + L -				CHARGE				IOF	
RANGE LATERAL SPREAD	RANGE				ELEVATION				·	
TIME OF OPENING FIRE	AZIMUTH							MARK TIME		
	ANGLE T				-					
OBSERVER CORRECTION CHART/SAFE	TY DATA			SUBSEC	QUENT COM	MANDS				
DEV RANGE TIME DEF/AZ (HEIGHT)	RANGE	MORTAR FIRE	METHOD FIRE	AIM AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV		
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BATTLE DAMAGE ASSESSMENT (BDA):			AIM PO	INT GRID:			1 0			

DA FORM 2399, MAY 2017

	For use of this form, s	DATA SHEET see TC 3-22.91. The propo	onent agency is TRAD	oc.	
SETUP		WEAPON DATA		FO DAT	Ά
TIME OUT:	UNIT:		14/2014	FO ALT	GRID
TGT PRFX:			WPN:		
TGT NO:	mm CAR: YES	DIR:	DIR:		
		DIS:	DIS:		
MIN E:	BP:				
MIN N:			WPN:		
	E:	DIR:	DIR:		
	N:	DIS:	DIS:		
	ALT:	WPN:	WPN:		
KEY TONE:	DEF:				
BLK: SNG DBL	ELE:		DIN		
OWNER ID:		DIS:	DIS:		
		AMMUNITION DAT	Ά		
TEMPERATURE		TYPE: 🗌 HE 🗌 W		3 🗌 TNG	
LOT NUMBER					
WEIGHT					
ON HAND					
RECEIVED					
TOTAL		· · · · · · · · · · · · · · · · · · ·			
ROUNDS EXPENDED					
ROUNDS REMAINING					
		TARGET DATA	- 1		
TARGET CHART ID DATA	FIRING CORRECTIONS	FIRING DATA	INTEL	LIGENCE	ROUNDS
TGT GRID ALT DEFL RG DE NO. CHG CC	EFL RANGE ALT ALT DE	EFL RG FUZE TIME ELEV CHG SETTING	V TIME TARGET M FIRED DESCRIPTION EN	IETHOD OF SURVEILLANCE	EXP REM
			+ $+$ $+$		
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OBSERVED CHART "BELOW THE PIVOT POINT"

- 1. If the range to the target is <u>2900</u> meters or more, index the DOF.
- 2. Drop below the pivot point 2000 meters for 60mm and 81mm. (3000m for 120mm)
- 3. Go to the left or right 500 meters from the vertical center line and plot the mortars.
- 4. Keeping the DOF indexed, plot the first round at the range determined.
- 5. Apply the "Round-Off" rule and superimpose the referred deflection under the mounting azimuth.
- 6. Determining data and applying FO corrections is the same as the pivot point method, **<u>but</u>** you must use the Parallel Line Method to obtain your deflection and initial azimuth.

MCS NOTES

MCS MISSION

For	CC use of this form, s	DMPU see TC 3-22	TER'SF 2.91; the pro	PECOR	D ncy is TRADOC	;				
ORGANIZATION	DA	TE	-	TIME	OBS	OBSERVER ID TARGET		TARGET N	UMBER	
ADJUST FIRE FIRE FOR EFFECT	SHIFT FROM		-		POLAR			9 9 9		
IMMEDIATE SUPPRESSION		· · · · · ·			OT DIRE	OT DIRECTION ALTITUDE				
	OT DIRECTION			_ DISTANC	DISTANCE					
GRID			-		VERTICA	VERTICAL INTERVAL				
OT DIRECTION										
ALTITUDE						VERTICAL ANGLE				
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					_			_	ROUNDS	
FDC ORDER		INITIAL C	HARTUAL	•	_	INITIAL FI	RECOMMAND		EXPENDED	
MORTAR TO FFE		۹			MORTAR	TO FOLLO	w			
MORTAR TO ADJ		I CORREC	TION		SHELL A					
METHOD OF ADJ		□ R								
BASIS FOR CORRECTION	RANGE			MORTAR	MORTAR TO FIRE					
SHEAF CORRECTION	VI/ALT CORRECTION				METHOD	OF FIRE			MAX ORD	
SHELL AND FUZE	- +	□+ □-								
	_ RANGE COR	RANGE CORRECTION					DEFLECTION			
METHOD OF FFE		□, □.				CHARGE				
RANGE LATERAL SPREAD	- RANGE	RANGE								
TIME OF OPENING FIRE	AZIMUTH _				TIME SET	TIME SETTING				
	ANGLE T				_	-				
OBSERVER CORRECTION CHART/SAF	ETY DATA			SUBSE	QUENT COM	ANDS				
DEV RANGE TIME DEF/AZ (HEIGHT)	RANGE	MORTAR FIRE	METHOD FIRE	AIM AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV		
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BATTLE DAMAGE ASSESSMENT (BDA):	8	· · · ·		AIM PC	DINT GRID:			19		

DA FORM 2399, MAY 2017

SHIFT FROM MCS MISSION

	For use of this form	, see TC 3-2	2.91; the prop	ECOR	D ncy is TRADOO						
ORGANIZATION	C	DATE	Т	IME	OBS	ERVER ID		TARGET N	UMBER		
		M			POLAR OT DIRE	CTION	AI	TITUDE			
LIMMEDIATE SUPPRESSION	OT DIRECTI					DISTANCE					
GPID					VERTICA	VERTICAL INTERVAL					
			хР		- VERTICA	VERTICAL ANGLE					
			vn		+						
									ROUNDS		
PDCORDER		INITIALO			_	INTIAL FI	RECOMMAND		EXPENDED		
MORTAR TO FFE	DEFLECTI	ON			MORTAR	TO FOLLO	w				
MORTAR TO ADJ	DEFLECTI	ON CORREC	CTION		SHELL A						
METHOD OF ADJ		. 🗆 R	£								
BASIS FOR CORRECTION	RANGE				MORTAR	MORTAR TO FIRE					
SHEAF CORRECTION	VI/ALT CO	RRECTION			METHOD	OF FIRE _			MAX ORD		
SHELL AND FUZE	□	. 🗆 -									
	RANGE CO	ORRECTION			DEFLEC	TION					
METHOD OF FFE		. 🗆 .			CHARGE	CHARGE					
RANGE LATERAL SPREAD	RANGE	-			ELEVATIO	ELEVATION					
TIME OF OPENING FIRE	AZIMUTH				TIME SET						
	ANGLE T	-			_	-					
OBSERVER CORRECTION CHA	RT/SAFETY DATA			SUBSE	QUENT COM	ANDS					
DEV RANGE TIME DE (HEIGHT)	F/AZ RANGE	FIRE	FIRE	AIM AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV			
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GRID TO GRID (MAP)

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ORGANIZATION	DATE		TIME	OE	OBSERVER ID TARGE		TARGET N	IUMBER	
	SHIFTFROM			IPOLAR	0				
	-			OT DIR	OT DIRECTION ALTITUDE				
LIMMEDIATE SUPPRESSION	OT DIRECTION	ALTIT	UDE	DISTAN	DISTANCE				
				VERTIC	VERTICAL INTERVAL				
GRID									
OT DIRECTION					VERTICAL ANGLE				
ALTITUDE		DOWN		+	- - +				
TARGET DESCRIPTION									
METHOD OF ENGAGEMENT									
FDC ORDER	INI	TIAL CHART D	ATA		INITIAL FI	RE COMMAND	1	ROUNDS EXPENDED	
MORTAR TO FFE	DEFLECTION				R TO FOLLO	w			
MORTAR TO ADJ	DEFLECTION CO	RRECTION		SHELL	AND FUZE				
METHOD OF ADJ		R		-	87				
BASIS FOR CORRECTION	RANGE				MORTAR TO FIRE				
SHEAF CORRECTION	VI/ALT CORRECT	метно	METHOD OF FIRE						
SHELL AND FUZE	D+ (
	RANGE CORREC	CTION		DEFLE	DEFLECTION				
METHOD OF FEE		□ -			CUADOS				
	CHARGE	CHARC	CHARGE						
RANGE LATERAL SPREAD	RANGE	ELEVAT	ELEVATION						
TIME OF OPENING FIRE	AZIMUTH			TIME SI	TIME SETTING				
	ANGLE T			_	-				
OBSERVER CORRECTION CHART/SAFI	ETY DATA		SUBS	EQUENT CO	MANDS	0 000000			
DEV RANGE TIME DEF/AZ (HEIGHT)	RANGE MOR	RTAR METH	OD AIM E AZIMUTH	DEFLECTIO	N CHARGE	TIME	ELEV		
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BATTLE DAMAGE ASSESSMENT (BDA):			AIM P	OINT GRID:			·> · ·		

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RESECTION

- 1. Two points (targets) must be known and on the chart.
- 2. Index the observers azimuth/direction to the two points and draw a line straight down the board.
- 3. Where the lines from the two points intersect is the location of the FO.

NOTES

RESECTION / POLAR

For us	COMPU e of this form, see TC 3	JTER'S -22.91; the pr	Oponent agen) icy is TRADOC	;				
ORGANIZATION	DATE		TIME	OBS	ERVER ID		TARGET N	UMBER	
ADJUST FIRE FOR EFFECT	SHIFT FROM		<u>18</u>	POLAR OT DIRE	CTION _	A			
LIMMEDIATE SUPPRESSION			E	DISTANC	DISTANCE				
GRID OT DIRECTION									
ALTITUDE									
TARGET DESCRIPTION									
METHOD OF ENGAGEMENT									
FDC ORDER	INITIAL	CHART DAT	A		INITIAL FI	RE COMMAND	8	ROUNDS EXPENDED	
MORTAR TO FFE	DEFLECTION			MORTAR	TO FOLLO	w			
MORTAR TO ADJ	DEFLECTION CORRI	ECTION		SHELL A	ND FUZE				
METHOD OF ADJ		R					53		
BASIS FOR CORRECTION	RANGE			MORTAR	MORTAR TO FIRE				
SHEAF CORRECTION	VI/ALT CORRECTION	METHOD	OF FIRE _			MAX ORD			
SHELL AND FUZE	□+ □								
	RANGE CORRECTIO	DEFLEC	DEFLECTION						
METHOD OF FFE	CHARGE	CHARGE				TOF			
RANGE LATERAL SPREAD	RANGE	ELEVATION							
TIME OF OPENING FIRE	AZIMUTH			_ TIME SET					
	ANGLE T			-	-				
OBSERVER CORRECTION CHART/SAFE			SUBSE	QUENT COM	ANDS	a arrante 6.			
DEV RANGE TIME DEF/AZ (HEIGHT)	RANGE MORTAF	R METHOD FIRE	AIM I AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV		
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			++		-				
			-		-				
			+ +						
		-			-				
BATTLE DAMAGE ASSESSMENT (BDA):			AIM PO	DINT GRID:					

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BASIC PROCEDURES

Modified Observed Firing Chart

- 1. Determine "Grid Intersection" to represent the pivot point.
- 2. Index 0/6400 mils on the plotting board.
- 3. Superimpose the Grid system:

A. Drop 2000 meters below the pivot point and on the vertical center line place the Easting indicator. Number every other grid line left and right of the vertical centerline. (Remember that the map's numbers increase as you go to the right and decrease as you go to the left.)

B. Move left 2000 meters from the pivot point and place the Northing indicator. (Remember that a map's numbers increase as you go up and decrease as you move down.)

- 4. Read the M16 plotting board as you would a map (right and up). Plot the mortar's position.
- 5. Round DOF to the nearest 50 mils to determine the MAZ. Superimpose the referred deflection scale at the MAZ.
- 6. Determine the deflection using the Parallel Line method.
- 7. Observer corrections, range, charge, and elevation data is acquired the same way as with the observed chart.
- 8. Altitude:

A. VI (Vertical Interval): VI is the altitude difference between the mortars and the target that is being fired upon. If the mortars are higher than the target, then the corrections will be a -, if the target is higher than the mortars, then the corrections will be a +.

B. Altitude Correction: The altitude correction is $\frac{1}{2}$ of the VI. This correction must be applied to each and every chart range to get command range.

Note #1: Always determine the altitude correction to the nearest meter and if the VI is less than 50 meters, an altitude correction doesn't exist.

Note #2: If the VI cannot be determined, assume the target altitude is the same as the mortars.

<u>A. Shift Missions:</u> The target is assumed to be the same altitude as the point being shifted from. If the observer sends a vertical shift, then the shift is applied to the point being shifted from and that is the new altitude to the target.

<u>B. Polar Missions</u>: The altitude of the target is the same as the observer if no vertical shift is given. If one is given then apply the vertical shift from the observer's location and that is the new altitude to the target.

ARTILLERY/MORTAR SAFETY RECORD

For use of this form, see USAIC Regulation 210-4; the proponent is DPTM, Range Control.

DATE: 10 SEP 07 (Date Approved by Rg Ctrl)

FIRING PO	FIRING POINT #				WEAPONS:							
COORDINA	ATES:			ELEV	: PD VT MO							
Weapon Projectile	Left Limit Mils	Right Limit Mils	Minimum Range Meters	Maximum Range Meters	Minimum Charge	Maximum Charge	Maximum Ordnance Meter or Feet					
SPECIAI	SPECIAL INSTRUCTIONS:											

a. This FB Form 210-4-2R must accompany the corresponding FB Form 210-4-3R.

- b. All roadblocks must be emplaced prior to firing. (See Roadblock Map Annex A)
- c. Mandatory cease fire time is 1200-1300 for downrange maintenance.

U.B. SAFE/CPT, IN /COMMANDING	NCOIC/GS11/RG CONTROL
NAME/RANK/SIGNATURE OF REQUESTING OFFICER	APPROVED BY:

FB Form 210-4-2R

Notes

TO DETERMINE THE DIRECTION OF FIRE

WHEN THE RIGHT LIMIT IS LARGER THAN THE LEFT LIMIT

ADD THE LEFT AND RIGHT AZIMUTHS AND DIVIDE BY 2.

LEFT LIMIT AZIMUTH _____ + RIGHT LIMIT AZIMUTH _____ =THE SUM ____ DIVIDED BY 2 = DOF

TO GET THE MOUNTING AZIMUTH, THE DOF IS ROUNDED OFF TO THE NEAREST 50 MILS.

WHEN THE RIGHT LIMIT IS SMALLER THAN THE LEFT LIMIT

ADD 6400 TO THE RIGHT LIMIT. SUBTRACT THE LEFT LIMIT FROM THE RIGHT LIMIT AZIMUTH AND DIVIDE BY 2, TAKE THAT REMAINDER AND ADD IT TO YOUR LEFT LIMIT TO DETERMINE THE DOF.

RIGHT LIMIT AZIMUTH ______ + 6400 = _____ - LL/AZ= _____ DIVIDED BY 2= _____(s)

(s) _____+ LL/ AZ (-RL/AZ) = ____ DOF

TO GET THE MOUNTING AZIMUTH, THE DOF IS ROUNDED OFF TO THE NEAREST 50 MILS.

TO DETERMINE THE LEFT AND RIGHT LIMIT DEVIATIONS

COMPARE THE LEFT AND RIGHT LIMIT AZIMUTHS TO THE MOUNTING AZIMUTH. SUBTRACT THE SMALLER FROM THE LARGER.

IF MAZ IS	MAZ	RL/AZ	IF RL/AZ IS
SMALLER THAN			SMALLER THAN
THE LL/AZ ADD	LL/AZ	MAZ	THE MAZ ADD
6400 TO MAZ			6400 TO RL/AZ
	LL/DEV	RL/DEV	

TO DETERMINE THE LEFT AND RIGHT LIMIT DEFLECTIONS

			LARS
REFERRED DEFLECT	ION		
LEFT DEVIATION	+	=	LEFT LIMIT DEFLECTION
REFERRED DEFLECT	ION	_	
RIGHT DEVIATION		=	RIGHT LIMIT DEFLECTION

SAFETY DIAGRAM



*NOTE: A SEPARATE SAFETY FAN WILL BE PREPARED FOR EACH FIRING POSITION AND TYPE OF MORTAR AND AMMUNITION, UNLESS THE BALLISTICS OF THE ROUNDS ARE COMPATIBLE.

					F	or use (of this	s form	, see	DAT TC 3-22	A SH	EE e pro	T opoi	nent a	igency is TRA	ADOC.				
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MIN N	:				_	WPN: WPN:														
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TA	RGE	ET	C I	HART DATA	0		NG CTION	1S		FI D	RING ATA				INT	ELLIGENCE			ROL	INDS
tgt g No.	BRID	ALT	DEFL	RG CHG	DEFL CORR	RANGE CORR	ALT Vi	ALT CORR	DEFL	RG CHG	FUZE TIN	AE E G	LEV	TIME FIRED	TARGET DESCRIPTION	METHOD OF	SU	RVEILLANCE	EXP	REM
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<u>NOTES</u>

A. GRID

- 1. INDEX "0".
- 2. PLOT GRID.
- 3. DETERMINE DATA.

B. SHIFT

1. INDEX OBSERVERS AZIMUTH/ DIRECTION.

2. APPLY OBSERVERS CORRECTIONS TO KNOWN POINT.

3. DETERMINE DATA.

C. POLAR

1. PLOT THE OBSERVERS POSITION.

2. INDEX THE OBSERVERS AZIMUTH/ DIRECTION.

3. PLOT THE ROUND AT THE GIVEN RANGE FROM THE OBSERVERS POSITION.

4. DETERMINE THE DATA.

SHIFT FROM FORWARD PLOT

			For us	C se of this form	SOMPU	TER'SF 2.91; the pro	PRECOR	D ncy is TRADOC	;					
ORGANIZ	ATION			D	ATE	1	TIME	OBS	ERVER ID		TARGET N	UMBER		
				SHIFT FRO	M			POLAR			2			
			REFFECT				28	OT DIRE	CTION	A	LTITUDE			
	DIATE SUP	-RESSION			DN			DISTANC	DISTANCE					
GRID								VERTICA		20				
		~				нт <u> </u>								
ALTITUDE						P		VERTICA	VERTICAL ANGLE					
								+						
TARGET DE	SCRIPTION	ThIT												
METHOD O	F ENGAGEN											ROUNDS		
-	FD	CORDER			INITIALC		`	_	INITIAL FIR	COMMAIND		EXPENDED		
MORTAR T	O FFE			DEFLECTIO	DN			MORTAR	TO FOLLO	w				
MORTAR T	O ADJ			DEFLECTIO	ON CORREC	TION		SHELL A						
METHOD C	F ADJ				R									
BASIS FOR	ASIS FOR CORRECTION							MORTAR	MORTAR TO FIRE					
SHEAF CO	HEAF CORRECTION				RECTION			METHOD	METHOD OF FIRE					
SHELL AND	FUZE			□ +	□ -									
				RANGE CO	RRECTION			DEFLEC	rion —					
METHOD C	F FFE				□.			CHARGE	CHARGETOF					
RANGE LAT	TERAL SPRE	AD		RANGE	-			ELEVATIO	ELEVATION					
TIME OF O	PENING FIR	E		AZIMUTH				TIME SET	TING			MARK		
MOC TYPE	WR 🗆 A	мс птот г	тотн 🖂	ANGLE T								TIME		
OBSER		ECTION	CHART/SAFE	TY DATA			SUBSE	QUENT COM	ANDS			<u>.</u>		
DEV	RANGE	TIME (HEIGHT)	DEF/ AZ	RANGE	MORTAR FIRE	METHOD FIRE	AIM AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV			
					-									
BATTLE DA	MAGE ASSE	SSMENT (BD)	N.	7			AIM PO	DINT GRID:						
DA FOR	MAGE AGGE		у.				THESTIFIE	and Grade.				ADD 1 Ctd 00		

DA FORM 2399, MAY 2017

MODIFIED OBS CHART (1st GRID MISSION)

			For us	C se of this form	See TC 3-22	TER'SR 2.91; the prop	ECOR	D ncy is TRADOC	;					
ORGANIZA	ATION			P	ATE	Т	IME	OBS	ERVER ID		TARGET N	UMBER		
	JST FIRE		REFFECT		M	ALTITUDE		POLAR OT DIRE		AI	TITUDE			
GRID OT DIRECT ALTITUDE	FION					іт IP IN			VERTICAL INTERVAL UP/ DOWN VERTICAL ANGLE +					
TARGET DE	SCRIPTION	8		_				_						
METHOD O	F ENGAGEM	IENT												
	FD	CORDER		1	INITIAL C	HART DATA			INITIAL FI	RE COMMAND	8	ROUNDS EXPENDED		
MORTAR T	O FFE			DEFLECTIO	DN				TO FOLLO	w				
MORTAR T	O ADJ	ADJ DEFLECTION CORRECTION SH												
							·							
BASIS FOR	CORRECTI	ON		RANGE				MORTAR	TO FIRE _					
SHEAF CO	RRECTION_			VI/ALT CORRECTION				METHOD	OF FIRE _			MAX ORD		
SHELL AND	FUZE				<u> </u>			-			6.5			
				RANGE CO				DEFLEC	DEFLECTION					
RANGE LAT	TERAL SPRE	AD		CHARGE				ELEVATIO	DN					
TIME OF O	PENING FIR	E		AZIMUTH								MARK		
MOC TYPE	WR 🗆 A			ANGLE T				_						
OBSER	VER CORRI	ECTION	CHART/SAFE	TY DATA			SUBSE	EQUENT COM	IANDS					
DEV	RANGE	TIME (HEIGHT)	DEF/AZ	RANGE	FIRE	FIRE	AIM AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV			
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BATTLE DA	MAGE ASSE	SSMENT (BDA	A):				AIM P	DINT GRID:						
DA FOR	M 2399.	MAY 2017		PRE	EVIOUS EDI	TIONS ARE (OBSOLETE					APD LC v1.00		

2nd GRID MISSION

		For us	se of this form	, see 10-3-2.	2.91; the pro	ponent ager							
ORGANIZATION				ATE		TIME	OBS	SERVER ID		TARGET N	IUMBER		
ADJUST FIRE		REFFECT	SHIFT FRO	M			POLAR OT DIRE	CTION	A	LTITUDE			
			OT DIRECTIO	DN		6 <u>0</u>	- DISTANC						
GRID					нт <u> </u>				L				
OT DIRECTION					P								
ALTITUDE					/N			+					
TARGET DESCRIPTION													
METHOD OF ENGAGEMEN	NT												
FDC (ORDER		1	INITIAL C	HART DATA			INITIAL FI	RE COMMAND	68	ROUNDS EXPENDED		
MORTAR TO FFE			DEFLECTIO	DN				R TO FOLLO					
MORTAR TO ADJ			DEFLECTIO	ON CORREC	TION		SHELL A	ND FUZE					
METHOD OF ADJ				□ R	<u>.</u>			87					
BASIS FOR CORRECTION	ı		RANGE					TO FIRE					
SHEAF CORRECTION			VI/ALT COF	RECTION			METHOD	OF FIRE _			MAX ORD		
SHELL AND FUZE			□+	□ -									
			RANGE CO	RRECTION			DEFLEC	DEFLECTION					
METHOD OF FFE			CHARGE	□ -			CHARG	E			TOF		
RANGE LATERAL SPREAD	o		RANGE				ELEVATI	ON					
TIME OF OPENING FIRE			AZIMUTH				_ TIME SE				MARK TIME		
MOC TYPE WR AMO			ANGLE T				-						
OBSERVER CORREC	TION	CHART/SAFE	TY DATA			SUBSE	QUENT COM	MANDS	-	· · · · · · · · · · · · · · · · · · ·	10 00		
DEV RANGE	TIME (HEIGHT)	DEF/ AZ	RANGE	MORTAR FIRE	METHOD FIRE	AIM AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV			
			-										
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			2	-				-					
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	MENT (DD)			L		AIM P							

DA FORM 2399, MAY 2017

POLAR MISSION

For u	COMPL se of this form, see TC 3-	JTER'SR -22.91; the prop	ECORE) cy is TRADOC	:					
ORGANIZATION	DATE	Т	IME	OBS	ERVER ID		TARGET N	IUMBER		
				POLAR OT DIREC	CTION _	AL	TITUDE			
LIMMEDIATE SUPPRESSION	OT DIRECTION	ALTITUDE		DISTANCE	DISTANCE					
				VERTICA		L				
GRID		GHT								
OT DIRECTION		ROP		VERTICAL ANGLE						
ALTITUDE		2WN								
TARGET DESCRIPTION				_						
METHOD OF ENGAGEMENT										
FDC ORDER	INITIAL	CHART DATA			INITIAL FI	RE COMMAND		ROUNDS EXPENDED		
MORTAR TO FFE	DEFLECTION				TO FOLLO	w				
MORTAR TO ADJ	DEFLECTION CORRE	ECTION		SHELL AN						
METHOD OF ADJ		R								
BASIS FOR CORRECTION	RANGE			_ MORTAR	MORTAR TO FIRE					
SHEAF CORRECTION	VI/ALT CORRECTION	i -		METHOD	METHOD OF FIRE					
SHELL AND FUZE		-								
	RANGE CORRECTIO	N		DEFLECT	DEFLECTION					
METHOD OF FFE		-		CHARGE	CHARGE					
RANGE LATERAL SPREAD	RANGE			ELEVATIO	DN			· <u> </u>		
TIME OF OPENING FIRE	AZIMUTH			TIME SET	TING			MARK		
	ANGLE T			-				TIME		
OBSERVER CORRECTION CHART/SAFE			SUBSEC	QUENT COMM	IANDS			2 <u>0</u>		
DEV RANGE TIME DEF/AZ (HEIGHT)	RANGE MORTAR FIRE	R METHOD FIRE	AIM E AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV			
							_			
		_								
		-								
BATTLE DAMAGE ASSESSMENT (BDA):		- 55	AIM PÒ	INT GRID:	1		22			

DA FORM 2399, MAY 2017

				F	or use o	of this	s form	see	DAT TC 3-22	A SH	EE e pr	T opol	nent a	igency is TRA	ADOC.				
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TIME O	JT:			٩U	NIT:										FO	Al	LT	GRID	
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WEIGHT	Г																		
ON HAN	D																		
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	тс	TAL																	
ROUND EXPENI	S DED																		
ROUND REMAIN	S IING																		
									TAR	GET D	AT.	A							
TAR	GET		HART DATA		FIRI		IS		FI D					INT	ELLIGENCE			ROL	INDS
tgt gri No.	D ALT	DEFL	RG CHG	DEFL CORR	RANGE CORR	ALT VI	ALT CORR	DEFL	RG CHG	FUZE TIN SETTING	AE E G	ELEV	TIME FIRED	TARGET DESCRIPTION	METHOD OF ENGAGEMENT	SU	JRVEILLANCE	EXP	REM
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REGISTRATION MISSION

			For u	C se of this form	SOMPU	TER'SF 2.91; the pro	ponent ager	D ncy is TRADO	C					
ORGANIZ	ATION				ATE		TIME	OBS	ERVER ID		TARGET N	IUMBER		
adji Dimme	UST FIRE EDIATE SUP		OR EFFECT	SHIFT FRO	M			POLAR OT DIRE		/	ALTITUDE			
GRID OT DIREC ALTITUDE	TION				ALTITUDE IT IP IN									
TARGET DE	ESCRIPTION		_											
METHOD O	F ENGAGE	IENT												
	FD	CORDER			INITIAL C	HART DAT/	A		INITIAL FI	RE COMMANE		ROUNDS EXPENDED		
MORTAR T	O FFE			DEFLECTIO	DN				TO FOLLO	w				
MORTAR T	0 ADJ								SHELL AND FUZE					
METHOD C	DF ADJ				□ R			-						
BASIS FOR	R CORRECTI	ON		RANGE					TO FIRE					
SHEAF CO	RRECTION_			VI/ALT COF			METHOD OF FIRE					MAX ORD		
SHELL ANI	D FUZE			RANGE CO	RRECTION				TION		- 68			
METHOD C	DF FFE				□.			CHARGE	CHARGE					
RANGE LA	TERAL SPRE	AD		RANGE				ELEVATI	ON		2	·		
TIME OF O	PENING FIR	E		AZIMUTH				_ TIME SET				MARK TIME		
MOC TYPE				ANGLE T				-			·			
OBSER	RVER CORR	ECTION	CHART/SAFE	TY DATA			SUBSE	QUENT COM	MANDS					
DEV	RANGE	TIME (HEIGHT)	DEF/AZ	RANGE	FIRE	FIRE	AIM AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV			
	· ·		· ·	·			<u> </u>	•	<u> </u>	•				
	· .	· ·	•					•		•	3	•		
	<u> </u>			2							- <u> .</u>			
BATTLE DA	AMAGE ASSE	ESSMENT (BD/	A):	1	L		AIM PC	DINT GRID:						
				00	WATE FIN	TRANS ADD	THEFT					100 1 0 4 00		

SURVEYED FIRING CHART

1. Two surveyed points: ONE BEING A MORTAR POINT AND A REGISTRATION POINT

2. Most accurate chart in mortars.

FIRING: Firing of this chart is the same as with the other charts only we must have two surveyed points. They will not move, so after firing on the registration point, we will have correcting data to apply for better accuracy.

SET UP OF THE CHART:

1. Same as with the modified.

2. Direction of fire is determined by aligning the mortars and registration point. Apply round off rule (nearest fifty) and superimpose referred deflection scale.

- 3. Fire mission as before.
- 4. Determine corrections.

DEFLECTION CORRECTION

DEFLECTION CORRECTION: Is the number of mils needed to correct the deflection to hit the target, since nonstandard conditions caused the hit deflection to the RP to be left or right of the initial chart deflection to the RP. Compare the initial chart deflection and the final chart deflection and subtract the smaller from the larger.

RULE: Final chart deflection larger, correct LEFT; final chart deflection smaller, correct RIGHT.

IF THE INITIAL CHART DEFLECTION IS LARGER:

INITIAL CHART DEFLECTION _____ - (MINUS) THE FINAL CHART

DEFLECTION = **A RIGHT CORRECTION** <u>**R**</u>

IF THE INITIAL CHART DEFLECTION IS SMALLER:

FINAL CHART DEFLECTION _____- (MINUS) THE INITIAL CHART

DEFLECTION ____ = A LEFT CORRECTION L

This deflection correction <u>must be</u> applied <u>to all</u> chart deflections processed for targets that are within the transfer limits of the RP.

RANGE CORRECTION

RANGE CORRECTION: Is the number of meters needed to correct the range to hit the target, since nonstandard conditions caused the hit range to the RP to be over or short of the initial chart range to the RP. Compare the initial chart range and the hit range (final chart) to determine the range correction. **RULE:** Initial chart range larger, correction will be - (minus); Initial chart range smaller, correction will be + (plus).

1. If the initial chart range is larger:

Initial o	chart	range	
-----------	-------	-------	--

Final chart range - _____

Range correction = - _____

2. If the initial chart range is smaller:

Final chart range _____

Initial chart range - _____

Range correction = + _____

This is used for determining the range correction for the INITIAL REGISTRATION ONLY!

RANGE CORRECTION FACTOR

RANGE CORRECTION FACTOR (RCF): Is the number of meters per thousand to be added to or subtracted from the chart range to hit a target within the transfer limits of the RP.

DETERMINING THE RCF: First determine the range correction for the RP. Then take the initial chart range and round off to the nearest hundred, then express it in thousands. Divide that number into the range correction. Round the answer to the nearest whole meter and use the sign of the range correction for the sign of the RCF.

1.	Initial chart range	
	Round off to nearest 100	
	Expressed in 1000)
	/	/
		DOE
	/	RCF
		Range correction

APPLYING REGISTRATION CORRECTIONS

Once the registration has been completed and the corrections determined, we must apply these corrections to all chart data for all targets within the transfer limits of the RP. This gives us COMMAND DATA which we send to the guns to obtain improved first round accuracy. **RULE:** Left add, Right subtract. (LARS)

If the deflection correction is a RIGHT,
 Initial chart deflection ______--R DEF CORR ______ = Command deflection ______.

If the deflection correction is a LEFT,
 Initial chart deflection _____ +L DEF CORR _____ = Command deflection _____.

TOTAL RANGE CORRECTION (TRC)

INITIAL CHART RANGE:

ROUNDED TO THE NEAREST 100:

EXPRESSED IN 1000'S:

RCF: <u>X</u>

RANGE CORRECTION:

ALT CORRECTION (+ OR -):

TRC:

EXAMPLE

INIT CHT RNG EXP IN 1000'S	Х	RCF	=	RANGE CORR.	+	ALT CORR.	=	TOTAL RNG CORR.
3.1	Х	+39	=	+121	+	+400	=	+521

TRC is the total number of meters that must be applied to the chart range to get the command range for entering the firing tables for the lowest charge and corresponding elevation. You must apply this to each and every chart range to get the command range for firing each round.

TRC MISSION

For us	C se of this form,	OMPU see TC 3-22	TER'SF 2.91; the pro	PRECORI	D ncy is TRAD	DC					
ORGANIZATION	D/	ATE	-	TIME	0	SERVER ID		TARGET N	IUMBER		
ADJUST FIRE FOR EFFECT	SHIFT FROM	M			POLAR	8					
DIMMEDIATE SUPPRESSION					OT DIF	ECTION	A	LTITUDE	·		
	OT DIRECTIO	N				ICE					
GRID		_	-		VERTI	CAL INTERVA	L				
			u		ᆝᆷᆙ						
			·		VERTI	CAL ANGLE	1				
			N		+		-				
TARGET DESCRIPTION											
METHOD OF ENGAGEMENT											
FDC ORDER		INITIAL C	HART DAT	4		INITIAL FI	RE COMMAND)	EXPENDED		
MORTAR TO FFE	DEFLECTIO	N				R TO FOLLO	w				
MORTAR TO ADJ	DEFLECTIO	N CORREC	TION		SHELL	AND FUZE					
METHOD OF ADJ		□ R			_			11			
BASIS FOR CORRECTION	RANGE					MORTAR TO FIRE					
SHEAF CORRECTION	VI/ALT COR	RECTION			METHO	METHOD OF FIRE					
SHELL AND FUZE	□ +	□ -			_						
	RANGE CO	RRECTION			DEFLE	DEFLECTION					
METHOD OF FFE	□+	□.			CHAR	CHARGE					
	CHARGE	20									
RANGE LATERAL SPREAD	RANGE	12			_						
TIME OF OPENING FIRE	AZIMUTH				_ TIME S				MARK TIME		
	ANGLE T				_						
OBSERVER CORRECTION CHART/SAFE	TY DATA			SUBSE	QUENT CO	MMANDS					
DEV RANGE TIME DEF/AZ (HEIGHT)	RANGE	MORTAR FIRE	METHOD FIRE	AIM AZIMUTH	DEFLECTIO	N CHARGE	TIME	ELEV			
								3			
						1					
						1					
BATTLE DAMAGE ASSESSMENT (BDA):	L			AIM PC	DINT GRID:			- 10 - 11 - 11			

DA FORM 2399, MAY 2017

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RE-REGISTRATION MISSION

For u	COMP ise of this form, see TO	PUTER'S 3-22.91; the p	RECOR	D ncy is TRADO()				
ORGANIZATION	DATE		TIME	OBS	ERVER ID	1	TARGET N	UMBER	
ADJUST FIRE FIRE FOR EFFECT	SHIFT FROM	ALTITUD	 ε	POLAR OT DIRE	CTION	AL	TITUDE		
GRID OT DIRECTION ALTITUDE	LEFT / D ADD / D UP / D	RIGHT DROP DOWN				L N			
TARGET DESCRIPTION									
METHOD OF ENGAGEMENT	101								
FDC ORDER	INITI	AL CHART DA	TA .		INITIAL FI	RE COMMAND		ROUNDS EXPENDED	
MORTAR TO FFE	DEFLECTION				MORTAR TO FOLLOW				
MORTAR TO ADJ		RECTION		SHELL A					
METHOD OF ADJ] R			· · · · · · · · · · · · · · · · · · ·				
BASIS FOR CORRECTION	RANGE			MORTAR	MORTAR TO FIRE				
SHEAF CORRECTION	VI/ALT CORRECTI	ON		METHOD	METHOD OF FIRE				
SHELL AND FUZE	RANGE CORRECT	J -		DEFLEC	DEFLECTION				
METHOD OF FFE].		CHARGE	CHARGE				
RANGE LATERAL SPREAD	RANGE				ELEVATION				
TIME OF OPENING FIRE	AZIMUTH			TIME SET	TING			MARK	
	ANGLE T			-					
OBSERVER CORRECTION CHART/SAF	ETY DATA		SUBSE	QUENT COM	IANDS				
DEV RANGE TIME DEF/AZ (HEIGHT)	RANGE MORT FIR	AR METHOD	AIM AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV		
		_							
							_		
BATTLE DAMAGE ASSESSMENT (BDA):			AIM PC	DINT GRID:	8 - E	8			

DEFLECTION CORRECTION (RE-REGISTRATION)

IF THE INITIAL CHART DEFLECTION IS LARGER: INITIAL CHART DEFLECTION _____ FINAL COMMAND DEFLECTION - _____ RIGHT CORRECTION **R**

IF THE INITIAL CHART DEFLECTION IS SMALLER: FINAL COMMAND DEFLECTION _____ INITIAL CHART DEFLECTION - _____ LEFT CORRECTION L_____

RANGE CORRECTION (RE-REGISTRATION)

IN ORDER TO DETERMINE THE RANGE CORRECTION FOR THE REREGISTRATION, WE MUST FIRST DETERMINE THE ADJUSTED COMMAND RANGE, WHICHIS THE FINAL COMMAND RANGE, WITH ALTITUDE CORRECTION DELETED.

FINAL COMMAND RANGE_____

REVERSE THE SIGN OF THE ALT. CORR. AND APPLY +/- _____ FINAL ADJUSTED COMMAND RANGE_____

COMPARE THE ADJUSTED COMMAND RANGE TO THE INITIAL CHART RANGE AND SUBTRACT THE SMALLER FROM THE LARGER.

IF INITIAL CHART RANGE IS LARGER: INITIAL CHART RANGE______ FINAL ADJUSTED COMMAND RANGE______ RANGE CORRECTION - ______

IF INITIAL CHART RANGE IS SMALLER: FINAL ADJUSTED COMMAND RANGE______ INITIAL CHART RANGE______ RANGE CORRECTION +_____

RANGE CORRECTION FACTOR

(RCF)

THE RANGE CORRECTION FACTOR IS DETERMINED IN THE SAME MANNER AS WITH THE INITIAL REGISTRATION.

DATA SHEET For use of this form, see TC 3-22.91. The proponent agency is TRADOC.																				
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TIME C	OUT:				4U	NIT:			W	₽N·				VPN.		FO	Α	ALT	GRID	
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TGT NO	D:					_ mm C. _	AR: [YES		R:			┦╹	NR:		-				
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	BALISTIC MET MESSAGE FOR USE OF THIS FORM, SEE FM 6-15: THE PROPONENT AGENCY IS TRADOC												
IDENTIF ICATION METB	TYP MSC K	E OCTANT	LOCATIO L _A L _A L _A L ₀ L OR C XXX X	N _o L _o)R XX	DATE YY	TIME (Gmt) G _A G _A C	DI (F	URATION HOURS) G	STA HEIC (10) h	ATION HT 's M) hh	MDP PRESSURE % STD P _d P _d P _d		
ZONE HEIGHT (METERS)		LINE NUMBER ZZ	WIND DIF (100's M) dd	RECTION	WIND S (KNOTS ff	PEED)		TEMPERTUR (% STD) TTT	RE]	PRESSURE (% STD) PPP		
SURFAC	E	00											
200		01											
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1000	1000 03												
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4000		07											
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FROM TO				DATE & T		DATE & TIME (LST)							
MESSAGE NUMBER				RECORD	ER			CHECKED					

DA 3675

FO	MET I OR USE OF THIS FORM	DATA COR	REC'	FION SHEE OPONENT AGENC	FOR MORT Y IS US CONTINENT	ARS	OMMAND
	COMMAND DATA	A			MET MESS	AGE	
CHARGE	COMMAND RANGE	ELEVATION		ТҮРЕ	STATION	DATE	
ALT OF MO	ORTARS (m)			TIME	ALT MDP	LINE NUMI	3ER
ALT OF N	1DP			WIND DIRECTION	WIND VELOCITY	AIR TEMP	AIR DENSITY
SECTION	ABOVE + N MDP A H BELOW -	+		A H CORRECTI	IONS	▲ ^T +	▲ ^D +
		WIND COMPO	NENTS	AND DEFLECTIO	ON CORRECTION		
WHEN DIR DIRECTION	ECTION OF WIND IS LI N OF FIRE ADD	ESS THAN	64	400			
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CROSS WINI RANGE WINI	D X R VELOCITY D X H VELOCITY	COMPONENT	=	L RK LATERAL WIN T HK RANGE WIND	D CORR FA	= ACTOR DE	FL CORR
		MET RANG	E COR	RECTIONS			
POWDEP TE	KNOWN VALUE	VALUES		FROM STANDAR	D CORRECTIO	NS PLUS	MINUS
RANGE WIN	$\begin{array}{c c} \Delta & V_{-} \\ \hline D & T \\ \end{array}$	0	I T				
AIR TEMP	H	0	H D				
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	MET CORRECTION TO	APPLY			TOTA	AL	
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LAST MESSA	AGE L R	+			RANGE CORF	۲ <u> </u>	
THIS MESSA	AGE L R	+					
CORR TO AP	PLY L R	+					
DA FOR	$\frac{M}{2T 71}$ 2601-1		REPLA	ACES DA FORM 26	601-1, 1 JUN 67, WHI	CH IS OBSOI	LETE. 36

36

CONCURRENT MET MESSAGE

			MI <u>121</u> 002 012 022 032 042 051 063	ETB31 1450 2109 2205 2318 2419 2620 1811 3123	344983 037988 029977 029976 033974 039974 039976 050977 050979							
IDENTIF T	YPE OCTANT	FOR USE C	BA DF THIS FORM, 2 DN I	ALISTIC SEE FM 6-1 DATE	C MET MESSA 15: THE PROPONEN TIME	GE VT AGENCY DU	IS TRADOC RATION	STATION	MDP DESCLIDE			
METE	K Q	OR OR XXX X	Co-o OR XXX	YY	G _A G _A G		G	(10's M) hhh	% STD P _d P _d P _d			
МЕТВ	3 1	344	983	12	145	5	0	037	7 988			
ZONE HEIGHT (METERS)	LINE NUMBER ZZ	WIND DII (100's M) dd	RECTION	WIND (KNOT ff	SPEED TS)	Г	EMPERTUR (% STD) TTT	Е	PRESSURE (% STD) PPP			
SURFACE	* 00		21		09		029		977			
200	01	^	22		05		029		976			
500	02		23		▶ 18		033		974			
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2000	05		18		11		050		977			
3000	06		31		23		050		979			
4000	07											
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8000	10											
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FROM TO	FROM TO				DATE & TIME (GMT)				DATE & TIME (LST)			
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81 MET STUDY GUIDE



MET CROSS



DETERMINATION AND APPLICATION OF MET

During the registration we shot out all of the known and unknown factors that effect the round as it goes down range. Now, with the new type of war that we have, we must be able to up date our equipment without firing. For this we will use the MET message

DETERMINING CORRECTIONS FROM MET

Along with the registration, you should get a met message. You must have two METs to compare to get the corrections to up date. Once you have worked the two METs, you have two sets of data; this is what you will use to get the corrections. The procedures to get the data are:

- A. The MET Cross
- B. "Where you are, Where are you going"



Use by placing the two met message data on.

B. "Where you are, where are you going": After placing the data from the met, use the statement.

APPLYING AND UP DATING

After determining the corrections from the met you then apply them by:

- A. Determining a new RNG CORR
- B. Determining a new RCF
- C. Determining a new DEF CORR

Remember that the met is based on the registration point and as with the first correction, we must use the same procedures.

A. Determining the new RNG CORR:

1. We already have a rng corr from the initial registration and to determine the new rng corr, you would either add or subtract the rng corr from the METs.

B. Determining the new RCF:

1. As before, once we have the rng corr, we must again: take the initial chart rng (Registration point), nearest 100, express in 1000's and divide that into the new rng corr.

C. Determining the new DEF CORR:

1. By applying the def corr from the METs to the def corr from the registration.

Once you have all the new corrections, you apply them as you did the first time. First up date the RP then the other targets.



Where are you going? L10 + 50

How will you get there? L30, +150

Def Corr: You must go from a R20 to a L10. First you have to go L20 in order to cover the R20 and then L10 more.

RNG Corr: You must first move from a -100 to a +100 and then +50 more.

A. RNG CORR: Range correction from the initial registration +75.

Range correction from the two METs +150

New range correction +75 +150 =225

B. RNG CORR FACTOR:

New Range correction +225 Initial Chart Range 3050, nearest 100=3100, expressed in thousands =3.1 $+225 \div 3.1 = 72.5 = +73$

C. Deflection Correction:

Def Corr from initial registration	L10
Def Corr from two mets	L30
New Def corr	L40
Opposite signs:	L30
Smaller than larger	R10
use sign of larger	L20

	DATA SHEET For use of this form, see TC 3-22.91. The proponent agency is TRADOC.																			
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tgt No.	GRID	ALT	DEFL	RG CHG	DEFL CORR	RANGE CORR	ALT Vi	ALT CORR	DEFL	EFL RG FUZE TIME ELE CHG SETTING				TIME FIRED	TARGET DESCRIPTION	METHOD OF ENGAGEMENT	SUR	VEILLANCE	EXP	REM
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SEARCH MISSION

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ORGANIZA	ATION			D	ATE	-	TIME	OB	OBSERVER ID TAR			IUMBER	
	JST FIRE		REFFECT	SHIFT FRO	M			POLAR OT DIRE		A	LTITUDE		
GRID						ALTITUDE		VERTIC		L //			
OT DIRECT ALTITUDE	TION		<u></u>			0P							
TARGET DE	SCRIPTION	E.											
METHOD O	F ENGAGEM	IENT											
	FD	CORDER			INITIAL C	HART DAT	4		INITIAL FI	RE COMMAND	62	ROUNDS EXPENDED	
MORTAR T	O FFE			DEFLECTIO	DN				MORTAR TO FOLLOW				
MORTAR T	O ADJ			DEFLECTIO	ON CORREC	TION		SHELL	AND FUZE				
METHOD C	F ADJ				R	£.							
BASIS FOR	CORRECTI	ON		RANGE					MORTAR TO FIRE				
SHEAF CORRECTION				VI/ALT COP	RECTION			METHO	METHOD OF FIRE				
SHELL AND	FUZE				□ -			-					
METHOD C	F FFE			RANGE CO	RRECTION			DEFLEC	DEFLECTION				
RANGE LAT	TERAL SPRE	AD		CHARGE				- ELEVAT	ELEVATION				
TIME OF O	PENING FIR	E		AZIMUTH								MARK TIME	
MOC TYPE	WR 🗆 A	мс птот с	отн 🗆	ANGLE T				-					
OBSER	VER CORR	ECTION	CHART/SAFE	ETY DATA			SUBSE	QUENT COM	MANDS		200000000		
DEV	RANGE	TIME (HEIGHT)	DEF/ AZ	RANGE	MORTAR FIRE	FIRE	AIM AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV		
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		<u>.</u>											
	MAGE ACC	COMENT (DD)					AIM P						
BATTLE DA	MAGE ASSE	SSMENT (BDA	v):				AIM PC	JINT GRID:					

DA FORM 2399, MAY 2017

SEARCH MISSION FORMULA

NUMBER OF ROUNDS: 1 RD COVERS 30M, 4 RDS COVER 100M

NUMBER OF TURNS	:		
ENTER THE FIRING	TABLE AT TH	E FINAL CH	HT RNG.
GO TO COLUMN 4 F	OR THE NUM	BER OF TUI	RNS
PER 100M.			
AREA TO BE COVER	ED (EXPRESS	ED IN 100th	s),
FROM THE CALL FO)R FIRE.		
			
NUMBER OF TURNS	PER 100M.		Χ
TOTAL NUMBER OF	TURNS PER G	UN.	
NIIMPED OF INTED	VAT C.		
NUMBER OF INTER		FCC THAN	THE NUMBED OF
NUMBER OF INTERV	VALS IS UNE L	ESS I HAN	I HE NUMBER OF
RDS IN THE FFE.			
	FFE RDS	1 =	INTERVALS
NUMBED OF TUDNS	RETWEEN DC		
NUMBER OF TURNS			
DIVIDE IUKNS,			

BY INTERVALS _____ = ___ ROUND TO THE NEAREST 1/2 TURN, EQUALS TURNS BETWEEN ROUNDS _____ .

TRAVERSE MISSION

ORGANIZATION DATE TIME OBSERVER ID DIMMEDIATE SUPPRESSION OT DIRECTION OT DIRECTION OT DIRECTION ALTITUDE DISTANCE VERTICAL INTERVAL VERTICAL INTERVAL	ALTITUDE	NUMBER				
Image: Constraint of the suppression Shift from POLAR Image: Constraint of the suppression OT Direction OT Direction OT Direction Altitude Distance Vertical interval Vertical interval	ALTITUDE	·				
OT DIRECTIONALTITUDE DISTANCE						
ALTITUDE						
		ROUNDS				
		EXPENDED				
MORTAR TO FFE DEFLECTION MORTAR TO FOLLOW	MORTAR TO FOLLOW					
MORTAR TO ADJ DEFLECTION CORRECTION SHELL AND FUZE	SHELL AND FUZE					
BASIS FOR CORRECTION RANGE MORTAR TO FIRE						
SHEAF CORRECTION VI/ALT CORRECTION METHOD OF FIRE	METHOD OF FIRE					
SHELL AND FUZE						
RANGE CORRECTION DEFLECTION	DEFLECTION					
METHOD OF FFE CHARGE	CHARGE					
RANGE LATERAL SPREAD RANGE LEVATION						
TIME OF OPENING FIRE AZIMUTH TIME SETTING		MARK TIME				
		2010/02/20				
OBSERVER CORRECTION CHART/SAFETY DATA SUBSEQUENT COMMANDS		0.00				
DEV RANGE TIME DEF/AZ RANGE MORTAR METHOD AIM DEFLECTION CHARGE TIME (HEIGHT)	ELEV					
BATTLE DAMAGE ASSESSMENT (BDA): AIM POINT GRID:	1					

TRAVERSE MISSION

AREA PER GUN:

1. Divide width (actual length) of target_____meters by number of guns_____= number of meters each gun has to cover.

NUMBER OF INTERVALS:

1. The number of rounds for FFE is determined by the area each gun has to cover.(1 round per 30 meters, 4 rounds per 100 meters.)

2. One less than the number of rounds to be fired in FFE_____rds.

- 1 = _____intervals.

MILS PER GUN:

- 1. Round final chart range to nearest 100 meters_____.
- 2. Enter D/C table at the rounded final chart range_____.
- 3. Go across the top of D/C to the number of meters each gun has to cover and go down to the rounded range, where they intersect is the number of mils each gun has to traverse._____

NOTE:

When entering the D/C table at number of meters each gun has to cover, if the number is not present enter at the closest one.. I.E. 80 meters, enter at 75 meters.

NUMBER OF TURNS PER GUN:

- 1. One turn of the traverse hand crank = 10 mils.
- 2. Number of mils _____ divided by 10 mils = _____(round off to the nearest whole number) = _____ = turns per gun.

TURNS BETWEEN ROUNDS:

1. Divide turns _____by intervals _____(round off to nearest 1/2 turn) = _____turns between rounds.

ILLUMINATION MISSION

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For us	COMPU e of this form, see TC 3-2	TER'SR 2.91; the pro	Ponent agence) cy is TRADO(
ORGANIZATION	DATE	1	TIME	OBS	ERVER ID		TARGET N	UMBER		
ADJUST FIRE FOR EFFECT				POLAR OT DIRE		AL	TITUDE			
GRID OT DIRECTION ALTITUDE		ALTITUDE HT DP WN	> <u></u>			L N				
TARGET DESCRIPTION					<u> </u>					
METHOD OF ENGAGEMENT										
FDC ORDER	INITIAL	HART DATA			INITIAL FI	RE COMMAND	_			
MORTAR TO FFE	DEFLECTION				MORTAR TO FOLLOW					
MORTAR TO ADJ	DEFLECTION CORREC	CTION		SHELL A	SHELL AND FUZE					
METHOD OF ADJ		t		-						
BASIS FOR CORRECTION	RANGE			_ MORTAR	MORTAR TO FIRE					
SHEAF CORRECTION	VI/ALT CORRECTION			METHOD	OF FIRE _			MAX ORD		
SHELL AND FUZE				-						
		D2		DEFLEC	DEFLECTION					
RANGE LATERAL SPREAD	CHARGE		;	ELEVATIO	CHARGE					
TIME OF OPENING FIRE	AZIMUTH			TIME SET				MARK TIME		
	ANGLE T			-						
OBSERVER CORRECTION CHART/SAFE	TY DATA		SUBSEC	QUENT COM	IANDS					
DEV RANGE TIME DEF/AZ (HEIGHT)	RANGE MORTAR FIRE	FIRE		EFLECTION	CHARGE	TIME	ELEV			
							3			
							0			
		-								
BATTLE DAMAGE ASSESSMENT (BDA):			AIM PO	INT GRID:	L					

DA FORM 2399, MAY 2017

ILLUMINATION

- 1. Entering the Firing Tables is at even 50 meters. Always round to the nearest 50 meters.
- 2. Everything is in relationship to the HOB (Height of Burst).
- 3. UP's and DOWN's (The FO will always send up's and down's to the nearest 50 meters)
 - a. Columns 2 & 3 is basic data for 600 meter height of burst.
 - b. Columns 4 & 5 is the data to change the height of burst 50 meters

NOTE: IF ABOVE H.O.B. USE THE SIGNS IN COLUMNS 4 & 5 IF BELOW H.O.B. REVERSE THE SIGNS IN COLUMNS 4 & 5

- 4. Range and deviation changes are plotted as with all other missions. a. The FO will always send these corrections in 200 meter changes.
- 5. All previous corrections (up, down, range, deviation) must be applied to the new data.

ILLUMINATION MARK

1. Control of firing the illumination and HE are done by the FDC.

2. The FDC will time the flight of the illumination round and compare that to the time of flight for the HE and fire the HE at that time difference. (Ill mark is when the FO has the best light for the target, the HE is fired at the difference so that it will impact at the best light). EXP: Ill T/F=63 seconds, HE T/F=23 seconds. Smaller from the larger, 63-23=40 seconds. Fire Ill and 40 seconds, later you would fire the HE.

3. T/F for HE must be determined each round to insure that it will impact at the best light. Enter the Firing tables at chart range to get T/F for HE.

ILLUMINATION CROSS



COORDINATED ILLUMINATION MISSION

For t	C use of this form	OMPU	TER'SR 2.91; the prop	ECORI) icy is TRADOC	:					
ORGANIZATION		ATE	Т	IME	OBS	ERVER ID		TARGET N	IUMBER		
	I SHIFT FRO	M			IPOLAR						
		<u> </u>		<u>. 18</u>	OT DIRE		A	LTITUDE	. <u> </u>		
		DN			DISTANC	E					
GRID					VERTICA	L INTERVA	1				
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			P		- VERTICA	L ANGLE					
			/N		+						
TARGET DESCRIPTION											
METHOD OF ENGAGEMENT											
FDC ORDER		INITIAL C	HART DATA		_	INITIAL FI	RE COMMAND	8	EXPENDED		
MORTAR TO FFE		DN			MORTAR	TO FOLLO	w				
MORTAR TO ADJ		ON CORREC	TION		SHELL A						
METHOD OF ADJ	. ם.	R				·					
BASIS FOR CORRECTION	RANGE				MORTAR	TO FIRE _					
SHEAF CORRECTION	VI/ALT COF	RRECTION			METHOD	METHOD OF FIRE					
SHELL AND FUZE	. □+	□ -									
	_ RANGE CO	RRECTION			DEFLECT	10N					
METHOD OF FFE		□.			CHARGE	CHARGE					
RANGE LATERAL SPREAD	RANGE					DN					
TIME OF OPENING FIRE	AZIMUTH				TIME SET				MARK		
	ANGLE T				_						
OBSERVER CORRECTION CHART/SAF	ETY DATA			SUBSE	QUENT COM	IANDS		•			
DEV RANGE TIME DEF/AZ (HEIGHT)	RANGE	MORTAR FIRE	METHOD FIRE	AIM AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV			
								8			
									•		
								8			
BATTLE DAMAGE ASSESSMENT (BDA):	-	VIOUSED		AIM PC	INT GRID:	1 - F		22	APD LCH 02		

SPLIT SECTION

1. MORTARS AT DIFFERENT POSITIONS:

- a. Use a different deflection scale for each mortar position (This causes less problems when deflections and elevations are sent to the guns).
- b. Firing at the same target:
 - 1. Use one section to adjust then engage with all.
 - 2. Commo is the most important consideration when in the split section operation

NOTE: To determine the mounting azimuth for each section:

- 1. Align each with a known target (RP) if you are within the same area of operation.
- 2. Outside of AO you will have to determine a DOF as with other charts.

SIMO MISSION

- 1. Mortars at the same position:
 - a. Firing at two targets:

1. Check the map before deciding which gun to use for the missions **NOTE:** (You do not want to cross fire within the section).

	For use of this for	DATA SHEET prm, see TC 3-22.91. The pro	F ponent agency is TRADO	ос. 1	& 2			
SETUP		WEAPON DATA		FO DA	ТА			
TIME OUT:	UNIT:			FO ALT	GRID			
TGT PRFX:		WPN:	WPN:					
TGT NO:	mm CAR:	YES DIR:	DIR:					
	F N	NO DIS:	DIS:					
MIN E:	- BP:							
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	E							
	F AI T	DIS:						
BIT RATE:	AZ:	WPN:						
KEY TONE:	DEF:	 DIR:						
	L ELE:							
OWNER ID:								
		AMMUNITION DA	TA					
TEMPERATURE	<u> </u>	TYPE: HE	WP [] ILL [] CS	S TNG				
LOT NUMBER								
WEIGHT								
ON HAND								
RECEIVED								
TOTAL					· · · · · · · · · · · · · · · · · · ·			
ROUNDS EXPENDED								
ROUNDS REMAINING								
		TARGET DATA	· · · · · · · · · · · · · · · · · · ·					
TARGET CHART ID DATA	FIRING CORRECTIONS	FIRING DATA	INTELI		ROUNDS			
TGT GRID ALT DEFL RG NO. CHG	DEFL RANGE ALT ALT CORR CORR VI COR	T DEFL RG FUZE TIME EL	EV TIME TARGET MI FIRED DESCRIPTION ENG	IETHOD OF SURVEILLANC	E EXP REM			

		Fo	or use c	of this	s form	, see '	DAT TC 3-22	A SH	EE 9 pro	T poi	nent a	igency is TRA	ADOC.		3	& 4	-
SETU	2					N	VEAPO	ON DA.	ГA						FO DAT	A	
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TGT NO:			mm C/	4R: [YES	S DI	R:			ļÞ	IR:						
ALARM:		F		C] NO	DI	S:] D	IS:						
MIN E:		BP	:							ϯ							
MIN N:	*	_				W	PN:			- ^	VPN:_						
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OWNER ID:			_ .	DIS: DIS:						_							
TEMPERATURE						ТҮР	E:	HE		WP	· [cs 🗌	ΤN	1G		
LOT NUMBER																	
WEIGHT																	
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RECEIVED																	
ΤΟΤΑΙ	•																
ROUNDS EXPENDED																	
ROUNDS REMAINING																	
	T						TAR	GET D		1							
TARGET ID	CHART DATA	с	FIRI	NG TION	IS		FI	RING ATA				INT	ELLIGENCE	:		ROL	INDS
TGT GRID ALT DEI NO.	L RG CHG	DEFL CORR	RANGE CORR	ALT Vi	ALT CORR	DEFL	RG CHG	FUZE TIN SETTING	IE EL G	LEV	TIME FIRED	TARGET DESCRIPTION	METHOD OF	r ^{Si}	URVEILLANCE	EXP	REM
														┦			
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SPLIT SECTION MISSION

For	COMP use of this form, see TC	3-22.91; the pro	Ponent agen) cy is TRADOC	:				
ORGANIZATION	DATE	Т	IME	OBS	ERVER ID		TARGET N	IUMBER	
ADJUST FIRE FIRE FOR EFFECT				POLAR OT DIREC		A	LTITUDE		
	OT DIRECTION	ALTITUDE		VERTICA	E L INTERVAL	30			
		RIGHT							
ALTITUDE					L ANGLE	-			
TARGET DESCRIPTION		<u></u>							
METHOD OF ENGAGEMENT									
FDC ORDER	INITIA	AL CHART DATA	1		INITIAL FIF	RE COMMAND)	ROUNDS EXPENDED	
MORTAR TO FFE	DEFLECTION				TO FOLLO	w			
MORTAR TO ADJ	DEFLECTION CORF	RECTION		SHELL A	ND FUZE				
METHOD OF ADJ		R		-	82				
BASIS FOR CORRECTION	RANGE			MORTAR TO FIRE					
SHEAF CORRECTION		DN	METHOD	METHOD OF FIRE					
SHELL AND FUZE	. 0+ 0	-							
8	RANGE CORRECTI	ON		DEFLECT	DEFLECTION				
METHOD OF FFE	- CHARGE	-		CHARGE				TOF	
RANGE LATERAL SPREAD	RANGE				DN				
TIME OF OPENING FIRE				_ TIME SET	TING			MARK TIME	
	ANGLE T								
OBSERVER CORRECTION CHART/SAF	ETY DATA		SUBSEC	QUENT COMM	IANDS				
DEV RANGE TIME DEF/AZ (HEIGHT)	FIRE	FIRE	AIM L AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV		
		_					-		
							8		
		_							
			-						
							-		
							-		
BATTLE DAMAGE ASSESSMENT (BDA):			AIM PO	INT GRID:			10	100 10 10 10	

				F	or use o	of this	s form,	see	DAT TC 3-22	A SH	EE e pr	T opol	nent a	agency is TR	ADOC.		S	[MC)						
	SE	rup			WEAPON DATA									FO DAT	Ά										
TIME OUT	:			١U	NIT:										FO	A		GRID							
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TGT NO:					_ mm C/	AR: [YES	ווס	R:			ᅴᄆ)IR:		_										
ALARM:		<u> </u>	N O	F] NO	DI	S:			┛	IS:		_										
MINE:				_ BF	BP: WPN' WPN'																				
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LOT NUM	BER																								
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ROUNDS EXPENDE	D																								
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TARGI ID	ET			C		NG CTION	IS		FI D	RING ATA				INT				ROL	INDS						
tgt grið No.	ALT	DEFL	RG CHG	DEFL CORR	RANGE CORR	ALT Vi	ALT CORR	DEFL	RG CHG	FUZE TIN SETTIN	ЛЕ G	ELEV	TIME FIRE	TARGET DESCRIPTION	METHOD OF ENGAGEMEN	r S	URVEILLANCE	EXP	REM						
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SIMO MISSION #1

For us	COMI se of this form, see TO	PUTER'SR 3-22.91; the pro	ECORI) cy is TRADOC	:					
ORGANIZATION	DATE	1	TIME	OBS	ERVER ID	. 1	ARGET N	IUMBER		
	SHIFT FROM			POLAR OT DIREC		AL	TITUDE			
	OT DIRECTION			DISTANCE	E					
0.010				VERTICA		Li				
		RIGHT				4				
		DROP			L ANGLE					
ALTITUDE		DOWN		+						
TARGET DESCRIPTION										
METHOD OF ENGAGEMENT										
FDC ORDER	INIT	AL CHART DATA			INITIAL FI	RE COMMAND		ROUNDS EXPENDED		
MORTAR TO FFE	DEFLECTION			MORTAR	TO FOLLO	w				
MORTAR TO ADJ	DEFLECTION COR	RECTION		SHELL AN	ND FUZE					
METHOD OF ADJ] R		-						
BASIS FOR CORRECTION	RANGE			MORTAR	TO FIRE					
SHEAF CORRECTION	VI/ALT CORRECTI	ON		METHOD	METHOD OF FIRE					
SHELL AND FUZE] -								
	RANGE CORRECT	TION		DEFLECT	DEFLECTION					
METHOD OF FFE] _		CHARGE				TOF		
RANGE LATERAL SPREAD	CHARGE _)N			. <u> </u>		
TIME OF OPENING FIRE	AZIMUTH			TIME SET	TING			MARK		
	ANGLE T			_				TIME		
OBSERVER CORRECTION CHART/SAFE			SUBSEC	QUENT COMM	ANDS			1 		
DEV RANGE TIME DEF/AZ (HEIGHT)	RANGE MORT	AR METHOD	AIM AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV			
BATTLE DAMAGE ASSESSMENT (BDA):		-	AIM PO	INT GRID:			19 I I			

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SIMO MISSION #2

For u	CC se of this form, s	DMPU see TC 3-22	TER'SF 2.91; the pro	PODENT ager	D ncy is TRADO()							
ORGANIZATION	DA	ΓE		TIME	OBS	ERVER ID		TARGET N	IUMBER				
ADJUST FIRE FOR EFFECT	SHIFT FROM	-		58	POLAR				1				
DIMMEDIATE SUPPRESSION					OT DIRE	CTION	AL	TITUDE					
	OT DIRECTION			5 <u></u>	- DISTANC	E							
GRID		-	-		VERTICA	L INTERVAL	10						
OT DIRECTION						DOMN							
		·		VERTICA	L ANGLE	3							
					+								
TARGET DESCRIPTION													
METHOD OF ENGAGEMENT	-				80								
FDC ORDER		HART DAT	4		INITIAL FI	RECOMMAND	8	EXPENDED					
MORTAR TO FFE	DEFLECTION	ı				MORTAR TO FOLLOW							
MORTAR TO ADJ	DEFLECTION	CORREC	TION		SHELL A								
METHOD OF ADJ		R			·								
BASIS FOR CORRECTION	RANGE					TO FIRE _		ALTITUDE					
SHEAF CORRECTION	VI/ALT CORF	ECTION			METHOD	METHOD OF FIRE							
SHELL AND FUZE	□+	□ -											
	RANGE COR	RECTION			DEFLEC								
METHOD OF FFE		□.			CHARGE				TOF				
RANGE LATERAL SPREAD	RANGE	27 27			ELEVATIO	DN			· · · · · ·				
TIME OF OPENING FIRE	AZIMUTH	_			TIME SET	TING			MARK				
	ANGLE T						_		TIME				
OBSERVER CORRECTION CHART/SAFE	ETY DATA	-		SUBSE	QUENT COM	ANDS			2 <u></u>				
DEV RANGE TIME DEF/AZ (HEIGHT)	RANGE I	MORTAR FIRE	METHOD FIRE	AIM AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV					
								3					
				1									
				-									
								-	7				
				1									
BATTLE DAMAGE ASSESSMENT (BDA):	t t			AIM PC	DINT GRID:	· · · · ·							

DA FORM 2399, MAY 2017

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TIME O	JT:			1U	NIT:										FO	А		GRID	
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TGT NC	:				_ mm C/	AR: [YES	וס	R:			┦╹)IR:						
ALARM:				F]NO		S:			┛	IS:		_				
MIN E:				_ BF) :			1.4.4				1.	10.1		7				
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OWNER	ID:								s:			- 1	ns:	· · ·					·
					AMMUNITION DATA														
TEMPE	RATUR	Е						ТҮР	E:	HE		WF	, <u> </u>) ILL 🗌	cs	Т	NG		
LOT NU	MBER																		
WEIGH	Γ																		
ON HAN	ID																		
RECEIV	ED			_															
	T	OTAL																	
Round Expeni	S DED								-										
ROUND REMAIN	S IING																		
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	GET		HART				is		FI D	RING ATA				INT	ELLIGENCI	E		ROL	INDS
TGT GRI NO.	D ALT	DEFL	. RG CHG	DEFL CORR	RANGE CORR	ALT Vi	ALT CORR	DEFL	RG CHG	FUZE TIN	AE E G	LEV	TIME	TARGET DESCRIPTION	METHOD OF	τs τ	URVEILLANCE	EXP	REM
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<u>FPF</u>

1. ADJUSTMENT:

a. Firing all guns and adjusting each to it's final location.

b. Attitude (both guns and target) FDC determines the dange close gun and adjust that one only and then the attitude is applied and a confirming round for each gun fired.

- c. Attitude for guns and target FDC applies the data but does not fire.
- **NOTE:** If the mission is danger close, 200-400 meters of troops, each gun should be adjusted onto the FPF using HED (D/C), and creeping adjustments.

FPF MISSION

For u	C(se of this form,	OMPU see TC 3-22	TER'SF 2.91; the pro	Ponent ager	D ncy is TRADOC					
ORGANIZATION	DA	TE		TIME	OBS	ERVER ID		TARGET N	IUMBER	
	SHIFT FROM				POLAR					
					OT DIRE	CTION	AL	TITUDE	·	
	OT DIRECTION	۷			DISTANC	E				
CRID					VERTICA	L INTERVA	L			
			т				4			
			P		- VERTICA	L ANGLE				
ALTITUDE			N		+					
TARGET DESCRIPTION										
METHOD OF ENGAGEMENT										
FDC ORDER	T	HART DATA	¥		INITIAL FI	RE COMMAND	1	ROUNDS EXPENDED		
MORTAR TO FFE	DEFLECTION	N				TO FOLLO	w			
MORTAR TO ADJ	DEFLECTION	NCORREC	TION		SHELL A					
METHOD OF ADJ		□ R								
BASIS FOR CORRECTION	RANGE				MORTAR	TO FIRE _				
SHEAF CORRECTION	VI/ALT COR			METHOD	OF FIRE _			MAX ORD		
SHELL AND FUZE	- +	□ -								
	RANGE COF	RECTION			DEFLEC	TION				
METHOD OF FFE	CHARGE	<u> </u>			CHARGE				TOF	
RANGE LATERAL SPREAD	RANGE				ELEVATIO	ON		2		
TIME OF OPENING FIRE	AZIMUTH _				TIME SET	TING			MARK TIME	
	ANGLE T				-					
OBSERVER CORRECTION CHART/SAFE	TY DATA		•	SUBSE	QUENT COM	IANDS		0000000000		
DEV RANGE TIME DEF/AZ (HEIGHT)	RANGE	MORTAR FIRE	METHOD FIRE	AIM AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV		
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BATTLE DAMAGE ASSESSMENT (BDA):				AIM PC	DINT GRID:					

DA FORM 2399, MAY 2017

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IMMEDIATE SMOKE MISSION

For u	COMPU se of this form, see TC 3-2	2.91; the prop	ECORI	D icy is TRADOC	:					
ORGANIZATION	DATE	Т	IME	OBS	ERVER ID	1	ARGET N	UMBER		
ADJUST FIRE FOR EFFECT				POLAR OT DIRE		AL	TITUDE			
	OT DIRECTION	ALTITUDE		- DISTANC VERTICA	E L INTERVAI	La				
OT DIRECTION		нт хр								
			+							
FDC ORDER	INITIAL C	HART DATA			INITIAL FI	RE COMMAND		ROUNDS EXPENDED		
MORTAR TO FFE	DEFLECTION				TO FOLLO	w				
MORTAR TO ADJ	DEFLECTION CORREC	CTION		SHELL A						
METHOD OF ADJ		č ·								
BASIS FOR CORRECTION	RANGE			MORTAR	MORTAR TO FIRE					
SHEAF CORRECTION	VI/ALT CORRECTION	METHOD	METHOD OF FIRE							
SHELL AND FUZE					~					
		ß		DEFLECT	DEFLECTION					
METHOD OF FFE	L+L- CHARGE			CHARGE				TOF		
RANGE LATERAL SPREAD	RANGE			ELEVATIO	DN					
	AZIMUTH			_ TIME SET			<u></u>	MARK TIME		
			SUBSE	QUENT COM	IANDS					
DEV RANGE TIME DEF/AZ (HEIGHT)	RANGE MORTAR FIRE	METHOD FIRE	AIM AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV			
							3			
BATTLE DAMAGE ASSESSMENT (BDA):			AIM PC	DINT GRID:						
DA FORM 2399. MAY 2017	PREVIOUS EDI	HONS ARE 0	DESOLETE.					APD LC v1.00		

QUICK SMOKE MISSION

For us	COMPU se of this form, see TC 3-2	TER'S 22.91; the pr	Oponent agen) cy is TRADO						
ORGANIZATION	DATE		TIME	OBS	ERVER ID		TARGET N	IUMBER		
ADJUST FIRE FIRE FOR EFFECT				POLAR OT DIRE	CTION _	AL	TITUDE	·		
			E		E					
GRID		нт				L N				
OT DIRECTION		OP			L ANGLE					
		WN		+						
TARGET DESCRIPTION	1									
METHOD OF ENGAGEMENT							TARGET NUME ALTITUDE ALTITUDE DMMAND EX Image: State Stat			
FDC ORDER	INITIAL	CHART DAT	A		INITIAL FI	RE COMMAND		EXPENDED		
MORTAR TO FFE	DEFLECTION				TO FOLLO	w				
MORTAR TO ADJ	DEFLECTION CORREC	CTION		SHELL A						
METHOD OF ADJ		2		·			TARGET NUMBER ALTITUDE			
BASIS FOR CORRECTION	RANGE				TO FIRE _					
SHEAF CORRECTION	VI/ALT CORRECTION			METHOD	METHOD OF FIRE					
SHELL AND FUZE	□+ □-	+ -				DEFLECTION				
	RANGE CORRECTION									
METHOD OF FFE	□, □.			CHARGE				TOF		
RANGE LATERAL SPREAD	CHARGE			ELEVATI	DN			. <u> </u>		
TIME OF OPENING FIRE	AZIMUTH			TIME SE				MARK		
	ANGLE T			-						
OBSERVER CORRECTION CHART/SAFE	TY DATA		SUBSEC	DUENT COM	MANDS	a konstructu				
DEV RANGE TIME DEF/AZ (HEIGHT)	RANGE MORTAR FIRE	FIRE	AIM E AZIMUTH	DEFLECTION	CHARGE	TIME	ELEV			
		-					2			
					-					
		+	-				0	7		
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BATTLE DAMAGE ASSESSMENT (BDA):			AIM PO	INT GRID:			· ·			

DA FORM 2399, MAY 2017



SMOKE AMMUNITION REQUIREMENTS FOR 4.2 inch Mortars

A. SMOKE CURTAIN

NUMBER OF WP ROUNDS PER MINUTE REQUIRED TO MAINTAIN A SMOKE CURTAIN ON A 500
METER FRONT IN FLANK WINDS 1 2 3

Relative Humidity	Temperature	Wind speed knots										
(percent)	gradient 4	2	4	9	13	18	22	26				
30	LAPSE NEUTRAL INVERSION	13 9 6	13 9 6	11 7 4	11 7	13 9	9	11				
60	LAPSE NEUTRAL INVERSION	9 6 3	9 6 3	7 4 3	9 4	9 6	7	9				
90	LAPSE NEUTRAL INVERSION	7 4 3	7 4 3	6 3 3	6 3	7 4	6	6				

B. OBSCURING SMOKE EFFECT

THE NUMBER OF ROUNDS PER MINUTE REQUIRED TO MAINTAIN AN OBSCURING SMOKE EFFECT ON A 500 METER FRONT IS OBTAINED BY DOUBLING THE VALUES IN A ABOVE.

1. TO ESTABLISH A SMOKE CURTAIN, EMPLOY VOLLEY FIRE, USING 2 MINUTES AMMUNITION REQUIREMENT (BUT NOT LESS THAN 12 ROUNDS) EQUALLY SPACED ROUNDS ON THE FRONT TO BE CURTAINED.

2. FOR QUARTERING WINDS, MULTIPLY TABLE VALUES BY 2; FOR TAIL WINDS, BY 2; FOR HEAD WINDS, BY 2 1/2. VALUES FOR HEAD AND QUARTERING WINDS ARE BASED ON CURTAIN IMPACT LINE OF 500 METERS IN ADVANCE OF ENEMY LINE. WIND DIRECTIONS ARE WITH RESPECT TO ENEMY TARGET OR SMOKE SCREEN. IF CURTAIN IMPACT LINE IS CLOSER THAN 500 METERS, AMMUNITION REQUIREMENTS WILL BE CONSIDERABLY LARGER. CONTROLLED FIRE BY OBSERVERS IS NECESSARY AT ALL TIMES.

3. TABLE QUANTITIES ARE FOR SHELL IMPACT ON LAND. FOR WATER IMPACTS, MULTIPLY TABLE VALUES BY 1.4.

4. SEE PARAGRAPH 39 FOR AN EXPLANATION OF TEMPERATURE GRADIENT CONDITIONS.

REF: FM 3-50

Smoke Ammunition Requirements for 120mm M929 WP

Number of M929 WP rounds per minute to maintain a smoke curtain on a 500 meter front in flank winds (1)(2)(3)

Relative Humidity	Temperature Gradient	Image: Wind Speed (knots) Image: Wind Speed (knots)										
%	(4)	2	4	9	13	18	22	26				
	LAPSE	12	6	6	6							
30	NEUTRAL	12	6	4	4	6	8	12				
	INVERSION	6	6	3								
	LAPSE	12	4	4	6							
60	NEUTRAL	12	4	3	4	6	6	8				
	INVERSION	6	6	3								
	LAPSE	8	4	3	4							
90	NEUTRAL	8	3	3	3	4	6	6				
	INVERSION	6	4	3								

(1) Fire a volley of 12 M292 cartridges with fuzes set "120mm PROX" to establish a smoke curtain. Equally space rounds on the front to be curtained.

(2) For quartering winds, multiply table values by 2; for tail winds, by 2; for head winds, by 2 ½. Values for head and Tail winds are based in curtain impact line of 500 meters in advance of enemy line. Wind directions are with respect to Enemy target or smoke screen. If curtain impact line of 500 meters in advance of enemy line. Wind directions are with respect to enemy target or smoke screen. If curtain impact line is closer than 500 meters, ammunition requirements will be considerably larger. **CONTROLLED FIRE BY OBSERVERS IS NECESSARY AT ALL TIMES.**

(3) Upwind adjustment point is 100 meters.

(4) Reference FM 3-50 appendix F or FM 6-30 Chapter 6 Section IV for an explanation of temperature gradient conditions

Smoke Ammunition Requirements for 81mm M819 RP Number of M819 RP rounds per minute to maintain a smoke curtain on a 500 meter front in flank winds

RELATIVE HUMIDITY	TEMPERATURE	Wind Speed (knots)								
(%)	GRADIENT	2	4	9	13	18	22	26		
30	LAPSE NEUTRAL INVERSION	6 2 2	6 4 3	12 8 8	12 8	16 16	24	24		
60	LAPSE NEUTRAL INVERSION	6 2 2	6 3 2	8 6 6	8 8	16 12	16	24		
90	LAPSE NEUTRAL INVERSION	2 2 1	3 2 2	8 6 4	8 8	12 8	12	16		

RANGE IN	DEFLECTION IN METERS														
METERS	1	10	20	30	40	50	75	100	125	150	175	200	300	400	500
500	2	20	41	61	81	102	152	201	250	297	343	388	551	687	800
600	2	17	34	51	68	85	127	168	209	250	289	328	472	599	708
700	1	15	29	44	58	73	109	145	180	215	250	284	412	529	632
800	1	13	25	38	51	64	95	127	158	189	219	250	365	472	569
900	1	11	23	34	45	57	85	113	141	168	196	223	328	426	517
1000	1	10	20	31	41	51	76	102	127	152	176	201	297	388	472
1100	1	9	19	28	37	46	69	92	115	138	161	183	271	355	435
1200	1	8	17	25	34	42	64	85	106	127	148	168	250	328	402
1300	1	8	16	24	31	39	59	78	98	117	136	156	231	304	374
1400	1	7	15	22	29	36	55	73	91	109	127	145	215	284	349
1500	1	7	14	20	27	34	51	68	85	102	118	135	201	265	328
1600	1	6	13	19	25	32	48	64	79	95	111	127	189	250	309
1700	1	6	12	18	24	30	45	60	75	90	105	119	178	235	291
1800	1	6	11	17	23	28	42	57	71	85	99	113	168	223	276
1900	1	5	11	16	21	27	40	54	67	80	94	107	160	211	262
2000	1	5	10	15	20	25	38	51	64	76	89	102	152	201	250
2100	0	5	10	15	19	24	36	48	61	73	85	97	145	192	238
2200	0	5	9	14	19	23	35	46	58	69	81	92	138	183	228
2300	0	4	9	13	18	22	33	44	55	66	77	88	132	175	218
2400	0	4	8	13	17	21	32	42	53	64	74	85	127	168	209
2500	0	4	8	12	16	20	31	41	51	61	71	81	122	162	201
2600	0	4	8	12	16	20	29	39	49	59	68	78	117	156	194
2700	0	4	8	11	15	19	28	38	47	57	66	75	113	150	187
2800	0	4	7	11	15	18	27	36	45	55	64	73	109	145	180
2900	0	4	7	11	14	18	26	35	44	53	61	70	105	140	174
3000	0	3	7	10	14	17	25	34	42	51	59	68	102	135	168
3100	0	3	7	10	13	16	25	33	41	49	57	66	98	131	163
3200	0	3	6	10	13	16	24	32	40	48	56	64	95	127	158
3300	0	3	6	9	12	15	23	31	39	46	54	62	92	123	153
3400	0	3	6	9	12	15	22	30	37	45	52	60	90	119	149
3500	0	3	6	9	12	15	22	29	36	44	51	58	87	116	145
3600	0	3	6	8	11	14	21	28	35	42	49	57	85	113	141
3700	0	3	6	8	11	14	21	28	34	41	48	55	82	110	137
3800	0	3	5	8	11	13	20	27	33	40	47	54	80	107	133
3900	0	3	5	8	10	13	20	26	33	39	46	52	78	104	130
4000	0	3	5	8	10	13	19	25	32	38	45	51	76	102	127

RANGE IN	DEFLECTION IN METERS														
METERS	1	10	20	30	40	50	75	100	125	150	175	200	300	400	500
4100	0	2	5	7	10	12	19	25	31	37	43	50	74	99	124
4200	0	2	5	7	10	12	18	24	30	36	42	48	73	97	121
4300	0	2	5	7	9	12	18	24	30	36	41	47	71	94	118
4400	0	2	5	7	9	12	17	23	29	35	40	46	69	92	115
4500	0	2	5	7	9	11	17	23	28	34	40	45	68	90	113
4600	0	2	4	7	9	11	17	22	28	33	39	44	66	88	110
4700	0	2	4	7	9	11	16	22	27	33	38	43	65	86	108
4800	0	2	4	6	8	11	16	21	27	32	37	42	64	85	106
4900	0	2	4	6	8	10	16	21	26	31	36	42	62	83	104
5000	0	2	4	6	8	10	15	20	25	31	36	41	61	81	102
5100	0	2	4	6	8	10	15	20	25	30	35	40	60	80	100
5200	0	2	4	6	8	10	15	20	24	29	34	39	59	78	98
5300	0	2	4	6	8	10	14	19	24	29	34	38	58	77	96
5400	0	2	4	6	8	9	14	19	24	28	33	38	57	75	94
5500	0	2	4	6	7	9	14	19	23	28	32	37	56	74	92
5600	0	2	4	5	7	9	14	18	23	27	32	36	55	73	91
5700	0	2	4	5	7	9	13	18	22	27	31	36	54	71	89
5800	0	2	4	5	7	9	13	18	22	26	31	35	53	70	88
5900	0	2	3	5	7	9	13	17	22	26	30	35	52	69	86
6000	0	2	3	5	7	8	13	17	21	25	30	34	51	68	85
6100	0	2	3	5	7	8	13	17	21	25	29	33	50	67	83
6200	0	2	3	5	7	8	12	16	21	25	29	33	49	66	82
6300	0	2	3	5	6	8	12	16	20	24	28	32	48	65	81
6400	0	2	3	5	6	8	12	16	20	24	28	32	48	64	79
6500	0	2	3	5	6	8	12	16	20	24	27	31	47	63	78
6600	0	2	3	5	6	8	12	15	19	23	27	31	46	62	77
6700	0	2	3	5	6	8	11	15	19	23	27	30	46	61	76
6800	0	1	3	4	6	7	11	15	19	22	26	30	45	60	75
6900	0	1	3	4	6	7	11	15	18	22	26	30	44	59	74
7000	0	1	3	4	6	7	11	15	18	22	25	29	44	58	73
7100	0	1	3	4	6	7	11	14	18	22	25	29	43	57	72
7200	0	1	3	4	6	7	11	14	18	21	25	28	42	57	71

MATH METHOD

(Observed Firing Chart)

Step 1- Take Mortar Position (MP) Grid and Forward Observer (FO) / Target (TGT) Grid and label them by Easting and Northing

Step 2- Covert all Grids to 10 digit Grids by adding a "0" to the Eastings and Northings.

Step 3- Individually compare TGT/FO Easting to MP Easting, Subtract the **SMALLER** from **LARGER**. Repeat with Northings.

Step 4- Determine Direction and Distance based of results from Step 3. ***YOU WILL ALWAYS COMPARE FROM MORTAR POSITION***

EX: MP Easting: 23450 - LARGER

TGT Easting: <u>21450</u> - SMALLER

2000(m) – Since the Mortar Position Easting is larger than the TGT Easting the direction you will move from the MP, on your plotting board, **WILL** be Left (map eastings ascend from Left to Right). Left 2000 meters

Ex: TGT Northing: 95120 - LARGER

MP Northing: <u>94150</u> – SMALLER

970(m) - Since the TGT Position Northing is larger than the MP Northing the direction you will move from your location (Left/Right), on your plotting board, **WILL** be Up (map Northings ascend from Bottom to Up). Up 970 meters

Combined it will look like: Right 2000m, Up 970m, FROM THE MORTAR POSITION.

When applying the "Math Method" to an Observed Firing Chart, Pivot Point method, you must index "0" and then move the distance you determined with your math. Your MP for Pivot Point will be the Pivot Point.

Ex: If I use the answers above I will be moving Right 2000m, Up 970m. First I will index "0" and then move Right 2000, Up 970 from the Pivot Point and plot my TGT. Once it is plotted, I will then parallel plot utilizing the Vertical Center Line with Range Scale just like a normal setup. I can then pull my Azimuth (DOF) and superimpose my Referred Deflection Scale.

The same process applies for an Observed Firing Chart, Below Pivot Point, except for now you can place your MP anywhere on the board as long as you can manipulate the distances to your FO/TGT.

Ex: If I am moving Right 2000, Up 970, I would place my MP in the left lower quadrant of the plotting board with "0" indexed to ensure I can apply the appropriate distance. One I have made my plot I would then parallel plot like I would when using the Modified Observe Firing Chart.