<b>TRAVERSE</b>	SPECIF	ICATIONS,
SECO	ND OR	DER

CLASS	1	JONE ONDE	. <u>.                                   </u>	
Principal station spacing	Seldom less than 4 km/ urban areas 0.3 km		Seldom less than 2 km/ urban areas 0.2 km	
Horizontal direction/a Instrument Number of observation Rejection limit from m	ons	0"2 1"0 8 or 12 <sup>1</sup> 5" 5"	0"2 6 or 5"	1"0 8 <sup>2</sup> 5"
Length measurement (Electro-optical or in Minimum number of measurements Minimum number of readings Minimum number of concentric measi Minimum number of offset measurem Standard error- Estimated by	frared)	1 10 1 1 1:300,000	1 10 1 1 1:120,000	
Reciprocal vertical angle observation Number and spread between observati Number of stations by known elevations Maximum time interva	ons etween	3 D/R-10 6-8 1	2 D/R-10 8-10 1	
Astro azimuths Number of courses b azimuth checks Number of observatio Number of nights Standard error  Azimuth closure at az	ons per night	10-12 16 2 0"45	15-20 12 1 0"6	
checkpoint:	Not to exceed  1"5/station or 3"0 √N  Urban areas seldom to exceed 2"0/ station or 3"√N  2		2"0/station or 4"5 √N Urban areas seldom to exceed 4"0/ station or 8"√N	
		2		

### TRAVERSE SPECIFICATIONS, SECOND ORDER (CONTINUED)

CLASS		ı	II	
Principal station spacing	Seldom less than 4 km/urban areas 0.3 km		Seldom less than 2 km/ urban areas 0.2 km	
Position closure <sup>3</sup>				
After azimuth adjus	tment	0.08m √k	0.2m √k	
•		or 1:50,000	or 1:20,000	

N is the number of stations for carrying azimuth, and K is the distance in kilometers.

<sup>3</sup> The expressions for closing errors in traverses are given in two forms.

The expression containing the square root is designed for longer lines where higher proportional accuracy is required.

Use the formula that gives the smallest permissible closure.

#### TRAVERSE SPECIFICATIONS, THIRD ORDER

		IIIND ONDER		
CLASS	I		II	
Principal station	Seldom less than .05 km/urban areas 0.1 km			
spacing				
Horizontal directions/a	ngles			
Instrument		1:0	1:0	
Number of observation	ns	4	2	
Rejection limit from n	nean	5"0	5:0	
Length measurements				
(Electro-optical or inf	rared)			
Minimum number of				
measurements		1	1	
Minimum number of	readings	10	10	
Minimum number of				
concentric measure	ments	1	1	
Minimum number of	offset			
measurements		0	0	
Standard error		1:60,000	1:30,000	
Estimated by1	/ <del>5</del>			
y O'm=	$\sqrt{\frac{2}{2}}$			
	n(n-1)			
		3		

<sup>&</sup>lt;sup>1</sup> May be reduced to 8 in urban areas <sup>2</sup> May be reduced to 4 in urban areas

#### TRAVERSE SPECIFICATIONS, THIRD ORDER (CONT)

CLASS	ı	, II ,		
Principal station spacing	Seldom	less than .05 km/urba	ın areas 0.1 km	
Reciprocal vertical ar	ngle			
observations				
Number and spread	d between			
observations		2 D/R-10"	2 D/R-20"	
Number of stations	between			
known elevations	3	10-15	15-20	
Maximum time inte	rval (hr)	1	1	
Astro azimuths				
Number of courses	between			
azimuth checks		20-25	30-40	
Number of observa	tions per night	8 <sup>1</sup>	4	
Number of nights		1	1	
Standard error		1:0	1."7	
Azimuth closure at azimuth				
checkpoint:		<ul> <li>Not to exceed</li> </ul>		
oncomponie.		3" 0/station	8"0/station	
		or 10" √N	or 30" √N	
		01 10 114	01 00 114	
Position closure <sup>2</sup>				
	tmont	0.4 m √K	0.8 m √K	
After azimuth adjus	unent	********		
		0r 4:40.000	or 1.5 000	
		1:10,000	1:5,000	

Where:

N is the number of stations for carrying azimuth, and K is the distance in kilometers.

Use the formula that gives the smallest permissible closure.

\*GTA 05-02-039

## TRAVERSE SPECIFICATIONS, SECOND AND THIRD ORDER

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Purpose: Use this GTA when performing a traverse. See FM 3-34.331 for more information.

\*This publication supersedes GTA 5-2-39, March 1989

<sup>&</sup>lt;sup>1</sup>Can be reduced to 4 when a T-3 is used.

<sup>&</sup>lt;sup>2</sup>The expressions for closing errors in traverses are given in two forms.

The expression containing the square root is designed for lines where higher proportional accuracy is required.