

\$ART 1 - GENERAL

1%1 &OR ' INCLUDED

1%: CODES AND STANDARDS

1%: %1 & "r4 !n\* 0 !teri!+( ) !+ .e in 2u+ ! , , "r\* !n, e 3it) C!+i2"rni! O , , u#!ti"n!+  
S!2et- He!+t) A, t 7CAL-OSHA/ C!+i2"rni! E+e, tri, !+ C" \*e 7CEC8/ St!te Fire  
M!r() !+/ E+e, tri, !+ S!2et- Or\*er( 7Tit+e </ Su. , ) !#ter B8/ t)e N!ti"n!+ Fire  
\$r"te, ti"n A( ( " , i!ti"n/ C!+i2"rni! Cui+\*in C" \*e 7CCC8> C!+i2"rni! C" \*e "2  
Re u+!ti"n( - Tit+e 2: !n\* "t)er !##i, ! .e St!te "r +", !+!3 ( "r re u+!ti"n(%  
N"t)in in t)e Dr!3in ( "r S#e, i2i, !ti"n( ) !+ .e , "n(true\* t" #er0it 3"r4 n"t  
, "n2"r0in t" t)e(e , " \*e(%

1%: %2 E+e, tri, !+ 0 !teri!+( ) !+ .e +i(te\*/ +! .e+e\*/ "r , erti2ie\* 2"r it( u(e . - ! N!ti"n!+-  
Re, " niDe\* Te(tin L! . "r!t"r- (u, ) ! ( Un\*er3riter?( L! . "r!t"rie( 7UL8/ F! , t"r-  
Mutu!+ 7FM8/ et, %

1%: %6 M!teri!+( !n\* , " 0#"nent( ) !+ , "n2"r0 t" In\*u(tr- St!n\*!r\*( / in, +u\*in E

NEMA - N!ti"n!+ E+e, tri, !+ M!nu2! , turer?( A( ( " , i!ti"n

ANSI - A0eri, !n N!ti"n!+ St!n\*!r\*( In(titute

ASTM - A0eri, !n S" , iet- 2"r Te(tin M!teri!+ A( ( " , i!ti"n

ISCEA - In(u+!te\* \$" 3er C! .+e En ineer?( A( ( " , i!ti"n

CCM - Certi2ie\* C!+!(t M!nu2! , turer(

1%: %: & )en C"ntr! , t D" , u0ent( \*i22er 2r" 0 "5ernin , " \*e(/ 2urni() !n\* in(t!+!r er  
(iDe "r)i )er (t!n\*!r\*( , !+e\* 2"r 3it) "ut e=tr! , ) !r e%

1%B RE9IE & OF MATERIALS



1%B%6 & )ere it i( in t)e .e(t intere(t "2 t)e O3ner/ En ineer 0!- i5e 3ritten , "n(ent  
t" ! (u. 0itt!+re,ei5e\* !2ter e=#ir!ti"n "2 \*e(i n!te\* ti0e+i0it(/ "r2"r !n  
! \*\*iti"n!+re(u. 0itt!+%

1%B%: Su. 0it 2"r !##r"5!+in !0#e ti0e t" !5"i\* \*e!- "2 , "n(tru,ti"n/ () "# \*r!3in (   
"r (u. 0itt!+( "n !+ite0( "2 e1ui#0ent !n\* 0!teri!+( , "5ere\* in+i(t 0enti"ne\*  
!. "5e% Su. 0it in !, , "r\*!n,e 3it) Gener!+ C"n\*iti"n( in ! , "0#ete #!,4! e>  
#!rti!+( u. 0itt!+( 3i+n"t .e , "n(i\*ere\*%

1%B%B F!i+ure t" , "0#+- 3it) !n- "2 t)e #re,e\*in re1uire0ent( 3i+n e,(it!te t)!t t)e  
(#e,i2ie\* 0!teri!+( .e (u. 0itte\* !n\* (u##ie\*%

1%6 RECORD DRA&INGS

1%6%1 U#"n , "0#eti"n "2 & "r4/ 2urni() En ineer 3it) Aut"CAD 2ie/ \$DF 2ie/ !n\* "ne  
718 #rinte\* 2u+ (iDe) !r\* , "#- u#"n 3)i,) (!) !+ .e () "3n !+ & "r4 in(t!+e\* un\*er  
,"ntr!,t in,+u\*in !n- & "r4 3)i,) !re n"t in !, , "r\*!n,e 3it) Ori in!+ C"ntr!,t  
Dr!3in (% Aut"CAD 2ie( () !+ .e 200: "r+!ter 5er(i"n/ 3it) e=tern!+ re2eren,e(  
. "un\* t" it( #!rent \*r!3in % \$r"5i\*e ! (e#!r!te \$D





1%B in,) !. "5e (urr"un\*in !re!% C!,42i+ !n\* , " 0#! ,t t" HB #er,ent 0 !=i0u0  
\*r- \*en(it- !t "#ti0u0 0 "i(ture , "ntent in +! -er( n"t t" e=,ee\* 6 in,) e( 3)en  
," 0#! ,te\*%

6%H EQUIPMENT ANCHORAGE

6%H%1 Sei(0i, An,) "r! e "2 E+e,tri, !+ e1ui#0ent () !+ , "n2"r0 t" t)e re u+!ti"n( "2  
CCC-2016 !n\* ASCE ; -10/ (e,ti"n( 16%6/ 16%:/ !n\* 16%6% A+ e1ui#0ent () !+ .e  
.r!,e\* "r !n,) "re\* t" re(i(t ! ) "riD"nt!+2"r,e !,tin in !n- \*ire,ti"n u(in t)e  
2"#+ "3in ,riteri!E

6%H%1%1 T)e t"t!+ \*e(i n+!ter!+ (ei(0i, 2"r,e () !+ .e \*eter0ine\* 2r" 0 (e,ti"n  
1616A C!+i2"rni! Cui+\*in C"\*e7CCC8 2016 !n\* 16%6 ASCE ; -10%  
F"r,e( () !+ .e !##ie\* in t)e ) "riD"nt!+ \*ire,ti"n(/ 3)i,) re(u+( in t)e  
0"(t ,riti, !+!+ !\*in ( 2"r \*e(i n%

6%H%1%2 T)e 5!+ue "2 A# 7, " 0#"nent ! 0#+i2i, !ti"n 2!,t"r8 !n\* R# 7, " 0#"nent  
re("#n(e 0 " \*i2i, !ti"n 2!,t"r8 "2 (e,ti"n 16%6%1 ASCE ; -10 () !+ .e  
(e+e,te\* 2r" 0 (e,ti"n 16%6-1 ASCE ; -10% T)e 5!+ue "2 l# 7(ei(0i,  
i0#"rt!n,e 2!,t"r8 () !+ .e (e+e,te\* 2r" 0 16%1%6 ASCE ; -10%

6%H%2 &)ere !n,) "r! e \*et!i+( !re n"t () "3n "n t)e \*r! 3in (/ t)e 2ie+\* in(t!+!ti"n  
() !+ .e (u.le,t t" t)e !##r"5!+ "2 t)e (tru,tur!+ en ineer !n\* t)e 2ie+\*  
re#re(ent!ti5e "2 t)e O22i,e "2 t)e St!te Ar,) ite,t%

6%10 ARC FLASH

6%10%1 E+e,tri, !+ e1ui#0ent (u,) !( (3it,) . " !r\* (/ #!ne+. " !r\* (/ +! " !\* ,enter(/ 0 "t"r  
," ntr"+ ,enter(/ in \*u(tri!+ , "ntr"+ #!ne+(/ 0eter ,enter( () !+ .e 2ie+\* 0!r4e\* t"  
3!rn #er("n( "2 # "tenti!+ e+e,tri, !r, 2!() ) !D!r\* ( #er CEC 110%16 !n\* NFSA  
; 0E St!n\* !r\* 2"r E+e,tri, !+ S!2et- in t)e & "r4#+!,e% Mini0u0 +! .e+ 3"r\*in  
() !+ .e ! ( 2"#+ "3(E

DANGER

Ar, F+!() !n\* S)" ,4 H!D!r\*%  
A##r"#ri!te \$\$E Re1uire\*%  
D" n"t "#er!te , "ntr"+( "r "#en "\*"r( 3it) "ut !##r"#ri!te  
#er("n!+ #r"te,ti"n e1ui#0ent%  
F!iure t" , " 0#+- 0!- re(u+t in in!ur- "r \*e!t)%

6%11 TEST

6%11%1 Te(t !+ 3irin !n\* , "nne,ti"n( 2"r , "ntinuit- !n\* r"un\* (> 3)ere (u,) te(t  
in \*i, !te 2!u+t- in(u!ti"n "r "t)er \*e2e,t(/ +, !te/ re#!ir !n\* rete(t% C!+!n,e+! "\*(  
!t#!ne+. " !r\*(% Furni() !+ te(tin e1ui#0ent%

6%12 CLOSING OF AN UNINSECTED & OR '

6%12%1 D" n"t !+ "3 "r , !u(e !n- "2 3"r4 in(t!+e\* )ereun\*er t" .e , "5ere\* u# "r  
en,+ (e\* .e2"re it) ! ( .een in(#e,te\* !n\* !##r"5e\*%

6%12%2 S) "u+\* !n- 3 "r4 .e en,+ "(e\* "r , "5ere\* u# .e2"re it )!( .een !##r"5e\*/  
un, "5er (u, ) 3 "r4 !n\* !2ter it )!( .een in(#e,te\* !n\* !##r"5e\*/ 0!4e !+  
re#!ir( ne,e(!r- t" re(t"re 3 "r4 "2 "t)er( t" , "n\*iti"n( in 3)i, ) it 3!( "2"un\* !t  
ti0e "2 ,uttin / !+ 3it)"ut !\*iti"n!+ , "(t" O3ner%

6%16 &ARRANTY

6%16%1 A+ 0 !teri!+( !n\* in(t!+!ti"n ( )!+ .e #r"5i\*e\* 3it) ! "ne 718 -e!r 3!rr!nt- 3)i,  
( )!+ in,+u\*e re#! ,e0ent #!rt(/+! . "r/ rete(tin / !n\* tr!5e+ t" !n\* 2r" 0 t)e A" .  
(ite% T)e 3!rr!nt- #eri" \* ( )!+ .e in !2ter 2in!+ ! ,e#!t!n,e "2 t)e #r" Ae,t% T)e  
3!rr!nt- ( )!+ , "5er .ut i( n"t+i0ite\* t" t)e 2"+ 3in E

6%16%1%1 De2e,ti5e 3 "r40 !n(i)# !n\* in(t!+!ti"n%

6%16%1%2 A+ S-(te0 , " 0#"nent(/ \*e5i,e(/ , "n\*uit/ 3ire(/ et,%

6%16%1%6 M!nu2! ,ture\* ite0 ( (u, ) !( +i )t 2i=ture(/ re,e#!t! ,e(/ (3it, ) . " !r\*/  
#!ne+ . " !r\*/ tr!n(2"r0er/ (3it, )e(/ et,%

6%16%1%: C!(i, 0 !teri!+( (u, ) !( , "n\*uit/ 3ire(/ . "=e(/ , !.inet(/ et,%

6%16%2 Cert!in 0 !nu2! ,ture\* ite0 ( 3i+ ) !5e+"n er 3!rr!nt- #eri" \* (% Re2er t" (#e,i2i,  
ite0 !n\* (#e,i2i, !ti"n (e,ti"n 2"r 3!rr!nt- in2"r0 !ti"n !n\* ter0 (%

6%1: S\$ARE \$ARTS AND S\$ECIAL SER9ICE AGREEMENTS

6%1:%1 A 0ini0u0 "2 B #er,ent !tti, (t" ,4 "n E+e, tr"ni, +i )tin C"ntr"+ \*e5i,e( (u, )  
!( # "3er #!,4(/ re+! -(/ " , , (en("r(/ 3!+ (3it, )e(/ \*! -+i )t (en("r(/ #u +") !\*  
 , "ntr"+er(/ #) "t" ,e+(/ ETC%

6%1:%2 Me, ) !ni, !+ !n\* E+e, tri, !+ (- (te0 ( t) !t re1uire re u+r/ 5er- (#e, i2i,  
0 !inten!n,e t" .e #er2"r0e\* T" in(ure t)eir #r"#er "#er!ti"n/ 2un\* ( ) "u+\* .e  
ln,+u\*e\* in t)e .i\* #!,4! e t" , "5er t)e , "(t "2 re u+r 0 !inten!n,e inter5!+  
. - "ut(i\*e (#e,i!+i(t F"r t)e e=#e,te\* +i2e "2 t)e e1ui#0ent% A (#e, i2i, E=! 0#e  
3 "u+\* .e .!,4-u# # "3er (- (te0 (%

END OF SECTION







2&2 BO9ES

2&2&1 # /1 ni8e0 !ne-\$ie,e !r (e/0e0 \$re++e0 +tee/ t6\$e& B! ?e+ \*!r \*i?ture +' // n!t  
-e /e++ t' n < in, 'e+ +5u re n0 +' // -e e5ui\$\$e0 (it' \*i?ture +tu0& B! ?e+ +' //  
-e t/e +t 1-1&2 in, ' 0ee\$2 < in, ' +5u re \*!r 1 !r 2 g ng 0e1i,e+2 (it' \$/ +ter  
ring+ n0 g ng -! ? (it' g ng ,!1er& B! ?e+ . !unte0 in ( // !r ,ei/ing . !uB! ?e

THBN-22 9HHB-22 !r RHB-2 in+u/ ti!n& >0 0egree+ C THHN . 6 -e  
u+e0 in Or6 n0 0 . \$/!, ti!n+& Bire in+t //e0 in 'ig' te. \$er ture re +2  
in,/u0ing -r n, ' ,ir,uit+ in !r -!1e r!!\* in+u/ ti!n !r in \*/u!re+,ent - // +t

2&5 CONCENIENCE OUTLETS

2&5&1 S' // -e FS\$e,i\*i, ti!nF gr Oe r te0 15 . \$ere+ t 125 1!/t+2 Ou\$/e?2 ,! . \$!+iti!n  
- +e (it' +/!t+t! ,,! . . !0 te \$ r //e/ \$/ug , \$+ (it' gr!un0ing \$eg& C!nt ,t  
+' // gri\$ -!t' +i0e+ !\* \$/ug \$r!ng+& B 'ere !n/6 !ne :1; re,e\$t ,/e i+ , !nne,te0  
t! 20 . \$ere ,ir,uit2 20 . \$ere re,e\$t ,/e + ' // -e u+e0& Out/et + ' // -e UL  
/i+te0& Re,e\$t ,/e+ t! -e Hu--e// !r e5u /&

2&5&1&1 15 A . \$7 Hu--e// 5262 +erie+ He 16 Dut6 In0u+tri / #r Oe2 4200 +erie+  
\*!r H!+\$it / #r Oe&

2&5&1&2 20 A . \$7 Hu--e// 5=62 +erie+ He 16 Dut6 In0u+tri / #r Oe2 4=00 +erie+  
\*!r H!+\$it / #r Oe&

2&5&1&= Ot'er 0e+ign ti!n+ + n!te0 -e/! (7

2&5&1&=1 #r!un0 F u/t7 #FR

2&5&1&=2 T . \$er Re+i+t nt TR

2&5&1&= Be t'er Re+i+t nt7 BR

2&5&1&=< l+!/ te0 #r!un07 I#

2&5&1&< Le!it!n 52522 5=522 42002 n0 4=00 +eriet+ , n -e , !n+i0ere0 e5u /&

2&5&1&5 % ++ K Se6 . !ur 52522 5=522 42002 4=00 +eriet+ , n -e , !n+i0ere0 e5u /&

2&5&2 %r!1i0e 0e1i,e+ (it' . t, 'ing \$/ te+& l+!/ te0 gr!un0 :l#; re,e\$t ,/e+ + ' // -e  
!r nge (it' . t, 'ing , !/!r \$/ te& H!+\$it / gr Oe re,e\$t ,/e+ + ' // ' 1e  
0i+tin,ti1e FgreenF 0!t& #Fl re,e\$t ,/e+ + ' // ' 1e 1i+i-/e :/ig't; in0i, t!r&  
C!ntr!//e0 re,e\$t ,/e+ + ' // -e \$er . nent/6 n0 1i+i-/6 . r)e0 (it' t'e  
uni1er+ / \$! (er +6 . -!/ n0 t'e ( !r0 ||CONTROLLEDN&

2551 In e/e1 t!r ,!ntr!/r!! . +&

2552 In e/e1 t!r \$it+A+' \*t&

255= In - t'r!! . + !r re+tr!! . +&

262= Circuit -re )er+ \*r .e+ !\* 1200A n0 'ig' er +' // -e +!/i0 +t te e/e, tr!ni,







2&11&2 L rger B! ?e+ :<4 in, ' ? =0 in, ' !r/ rger;7 %re, +t 'ig' -0en+it6 rein\*!r, e0  
, !n, rete (it' en0 n0 +i0e )n!, )!ut+2 \$u//ing-in ir!n+& Mini . u . < in, ' ( //  
t'i,)ne++& C!!r0in te +i8e !\*t'in ( // )n!, )!ut+ (it' . nu\* ,turer\*!r ,!n0uit  
entr6& A, ,e\$t -/e . nu\* ,turer+ +' // -e F!rni2 C'ri+t6 !r e5u /&

2&11&= S . //er B! ?e+ :+. //er t' n <4 in, ' ? =0 in, ' ;7 %re, +t 'ig' -0en+it6 rein\*!r, e0  
, !n, rete (it' en0 n0 +i0e )n!, )!ut+2 n0 e?ten+i!n +re5uire0& Mini . u . 1&5

2&11&3&1 A// !\* t'e e5ui\$ . ent gr!un0ing , !n0u,t!r+ in t'e \$u//-! ? + ' // -e  
gr!un0 - !n0e0 t!get'er u+ing t'e / rge+t gr!un0ing , !n0u,t!r in t'e  
-! ? !r gr!un0ing ter . in /&

2&11&3&2 #r!un0 -!n0 t'e . et / , !1er t! t'e !t'er gr!un0 , !n0u,t!r+ u+ing t'e  
/ rge+t gr!un0 , !n0u,t!r in t'e \$u//-! ?&

2&11&3&= Ot'er gr!un0ing . et' !0+ re //! (e0 ( 'ere +u- . itte0 n0 \$\$r!1e0&

2&12 BAC I BOARDS

2&12&1 B , )-! r0+ + ' // -e =A< in, ' \$/6 ( !!02 t6\$e A-C gr 0e \*ire tre te0 \*!r interi!r u+e2  
n0 t6\$e E?teri!r #r 0e \*!r !ut0!!r u+e& B , )-! r0

2&16&1&1 Mini . u . +urge ,urrent r ting7 160 )A \$er \$' +e&

2&16&1&2 C/ . \$ing \$er\*!r . n,e r ting \$er UL1<<> =r0 e0iti!n7

|     | <u>M!0e 120A204C</u> | <u>&lt;40A233C</u> |
|-----|----------------------|--------------------|
| L-N | <00C                 | 400C               |
| L-# | <00C                 | 400C               |
| N-# | <00C                 | 400C               |

2&16&2 B 'ere in0i, te0 t\$ ne/+ n0 !t'ert' n . in +er1i,e /!, ti!n+2 \$r!1i0e intern //6 . !unte0 S%D2 S5u re-D SurgeL!gi,2 E t!n Cut/er-H . .er2 #&E& !r e5u /& B 'ere intern / . !unting i+ n!t \$r ,ti, / \$r!1i0e e?tern //6 . !unte0 (it' ,/!+e ni\$\$/e , !nne,ti!n2 Le1it!n 52000 Serie+ !r e5u /&

2&16&2&1 Mini . u . +urge ,urrent r ting7 100 )A \$er \$' +e&

2&16&2&2 C/ . \$ing \$er\*!r . n,e r ting \$er UL 1<<> =r0 e0iti!n7

|     | <u>M!0e 120A204C</u> | <u>&lt;40A233C</u> |
|-----|----------------------|--------------------|
| L-N | <00C                 | 400C               |
| L-# | <00C                 | 400C               |
| N-# | <00C                 | 400C               |

2&16&= S%D 0e1i,e+ + ' // -e Li+te0 n0 C! . \$!nent Re, !gni8e0 in , , !r0 n,e (it'7

2&16&=1 UL 1<<> T'ir0 E0iti!n&

2&16&=2 UL 124=&

2&16&= NEMA LS-1 :1>>2; L! ( C!/t ge Surge %r!te,ti1e De1i,e+&

2&16&=< ANSI/IEEE C62&<12 Re, ! . .en0e0 %r ,ti,e \*!r Surge C!/t ge+ in L! (- C!/t ge AC %! (er Cir,uit+2 C teg!r6-C&

2&16&=5 ANSI/IEEE C62&<52 #ui0e !n Surge Te+ting \*!r E5ui\$ . ent C!nne,te0 t! L! (-C!/t ge AC %! (er Cir,uit+&

2&16&=6 C! . \$/6 (it' CEC Arti,/e 245&



2&13&5 N!n- . et //i, r ,e( 6 +6+te . + +' // n!t -e u+e0 in A++e . -/6 re + n0 !t'er  
re + ( 'ere t'e +6+te . i+ n!t r te0 \*!r t'e in+t // ti!n& A++e . -/6 re + in,/u0e  
-ut n!t/i . ite0 t!G g6 . n +iu . +2 . u/ti\$ur\$!+e r!! . +2 u0it!riu . +2 , !n\*eren,e  
r!! . +2 et,&

2&14 COCER %LATES

2&14&1 S(it, ' n0 re,e\$t ,/e , !1er \$/ te+ +' // -e + . !!t' n6/!n t6\$e& C!1er \$/ te+ \*!r  
!t'er 0e1i,e+A!ut/et+ +u, ' + 0 t 2 te/e\$' !ne2 te/e1i+i!n2 et,& + ' // -e n6/!n&  
C!1er \$/ te ,!/!r+' // -e i!r62 . t,'ing // +6+te . +&

2&14&2 F!r . u/ti-\$ur\$!+e r!! . +2 g6 . n +iu . +2 )it, 'en+2 /! , )er r!! . +2 t!i/etAre+tr!! . +2  
n0 ( //+ +u, ' + CMU2 -ri,)2 , !n, rete -/! ,)2 n0 , !n, rete ( //+2 0e1i,e \$/ te+  
+' // -e + . !!t' +t in/e++ +tee/ (it' -e1e/e0 e0ge&

2&14&= E , ' re,e\$t ,/e + ' // ' 1e it+ ,ir,uit i0enti\*i, ti!n !n t'e , !1er \$/ te :i&e&2  
FLA112F;& U+e t6\$e (ritten F,/e r t \$eF& U+e -/ , ) /etter+Anu . -er+ \*!r /ig't

=&1&1&=&1< C!n,e /e0 -!1e +u+\$en0e0 ,ei/ing+ !r ,ei/ing+ 0ire,t/6  
tt , 'e0 t! +tru,ture -!1e&

=&1&2 F/e?i-/e , !n0uit7 S' // -e u+e0 t! \$r!1i0e \*e?i-/e , !nne,ti!n+ !\* + ' !rt /engt' :=  
\*t !r /e++; t! e5ui\$. ent +u-!e,t t! 1i-r ti!n !r . !1e . ent n0 t! // . !t!r+& U\$t!  
6 \*t i+ //! ( 'ere 00iti!n / \*e?i-/it6 i+ nee0e0& %r!1i0e +e\$ r te -!n0ing  
, !n0u,t!r in // \*e?i-/e , !nne,ti!n+!, !n0uit& F/e?i-/e , !n0uit + ' // -e !ne  
, !ntinu!u+ /engt' (it' !ut , !u\$/ing+&

=&1&2&1 Se,ure \*e? , !n0uit (it' in 12 in, 'e+ !\* e , ' -!?? , -inet2 , !n0uit -!062  
!r !t'er ter . in ti!n2 n0 . ?i . u . <&5 \*t !n , enter& Re\*er t! t'e CEC \*!  
!t'er +e, ure /engt' + ( 'ere \*e?i-/it6 i+ re5uire0 !r in !t'er +\$e, i,  
in+t n, e+&

=&1&= Run , !n0uit , !n, e /e0 in re + ' 1ing \*ini+ 'e0 , ei/ing+ n0 in ( //+& Run //  
, r!++ , !n0uit+ n0 1erti, /ri+er+ !r Or!\$+ , !n, e /e0 in ( // n0!r \$ rti!n+&  
S' !u/0 it -e ne, e++ r6 t! n!t, ' n6 \*r . ing . e . -er+2 . )e +u, ' n!t, 'ing !n/6  
t!/, ti!n+ n0 in . nner + \$ \$r!1e0 -6 t'e Ar, 'ite,t& B 'ere , !n, e /ing  
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END OF SECTION

ART 1 " GENERAL

1.1 RELATED DOCUMENTS

- 1.1.1 Drawing(s) generated by the software used in the design. The software used in the design shall be the latest version available at the time of design.
- 1.1.2 Design shall be in accordance with the latest edition of the National Electrical Code (NEC) and all applicable local codes.

1.2 REFERENCE STANDARDS

- 1.2.1 ANSI/TIA-562-AAAC-B - Detail of the system shall be in accordance with the latest edition of the ANSI/TIA-562-AAAC-B standard.
- 1.2.2 ANSI/TIA-562-AAAD - Detail of the system shall be in accordance with the latest edition of the ANSI/TIA-562-AAAD standard.
- 1.2.3 ANSI/TIA-562-CAAB - Detail of the system shall be in accordance with the latest edition of the ANSI/TIA-562-CAAB standard.
- 1.2.5 ANSI/TIA-837-0-D - General Conditions shall be in accordance with the latest edition of the ANSI/TIA-837-0-D standard.
- 1.2.8 ANSI/TIA-837-1-D - Conditions of Use shall be in accordance with the latest edition of the ANSI/TIA-837-1-D standard.

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# TELECOMMUNICATIONS CABLING SYSTEM



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- 1%6%= A\*\* -!re 2!\*e( n) EMT (\*ee+e( ;et' een ,!!r( ,!r t2e r!uting !, C! / /uni- ti!n( - ;\*ing%
- 1%6%5 B -1 ;!:e( ,!r t2e / !unting !, NEMA r te) , -e#\* te(%
- 1%6%8 Dr g \*ine !r #u\*\* (tring t t2e ; -1 ;!:e( ,i(2e) t2r!ug2 e:i(ting EMT. -!n)uit. !r ' \*\* - +itie( @DRing n) StringDA t! t2e --e((i;\*e -ei\*ing !r !t2er en) !, -!n)uit. ,!r in(t \*\*ing 5 # ir. / u\*ti-# ir !r ,i;er !#ti- @2!ri9!nt \* n) ; -1;!neA - ;\*e(%
- 1%6%3 Mini /u/ !, t' ! @2A ' \*\*(-!+ere) in K in-2 AC gr )e #0' !!) # inte) ' 2ite ' it2 ,ire ret r) nt # int in e -2 -r!(( -!nne-t -\*(et !r -!nne-ti!n #!int ,!r ) t . +!i-e. +i)e!. (e-urit0 n) ;ui\*)ing ut! / ti!n (0(te / (% \$0' !!) ' \*\* (2 \*\* ;e -!+ere) 5 ,t ? : 7 ,t H ' 2ene+er #!(i;\*e%
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\$ART 2 - \$RODUCTS

2%1 GENERAL

- 2%1%1 \$r!+i)e -! / #\*ete r -e' 0. !ut\*et ;!:e( n) / i(-e\*\* ne!u(ite / ( ( reCuire)%
- 2%1%2 Uti!9e 5-11413 in-2 (Cu re !ut\*et ;!: @ / inA t e -2 !ut\*et \*- ti!n 'it2 (ing'e g ng #\* (ter !r ti\*e ring n) 1 in-2 -!n)uit t! - ;\*e tr 0. ; -1;! r). !r --e((i;\*e -ei\*ing !r ,!!r (# -e%
- 2%1%= \$r!+i)e -! / #\*ete ) t - ;\*ing n) )e+i-e (0(te / ( )e(-ri;e) 2erein%
- 2%1%5 ? !r1 re -!nne-t!r( (2 \*\* ;e !, n!n-#r!#riet r0 DGe0(t!neD-(t0\*e #!rt -!n,igur ti!n. (u-2 t2 t t2e0 ,it int! \*\* ,urniture. # ne\*(. ' \*\*#\* te(.r -e' 0( ,!!r / !nu / ent(. #!1e-t2r!ug2( n) A> ;!:e( 'it2!ut ) #ter(% M :i / u /

)en(it0 !, 3 CAT3A !ut\*et( (2 \*\* ;e + i\* ;\*e in De-!r ,!!t#rint ' 2ere reCuire).  
n) 57 #!rt( in 1RU # ne\* / 0 ;e reCuire) in (e\*e-t 2ig2 )en(it0 \*!- t09(2)0.5900cmA / R7 g



2%8%1%1%1 Be 7-#!(iti!n4 7 -!n)u-t!r @7\$7C. RF58-(t0\*eA /!)u\* r B -1(

2%8%1%1%2 Uti'i9e uni+er( \* Ge0(t!ne-(t0\*e in(erti!n,!!t#rint ( t2e  
/ nu, -turerP( / in D,\* g(2i#D \*ine !, #r!)u-t(

2%8%1%1%= C! / #\*0 ' it2 FCC \$ rt 37J UL \*i(te) n) CSA Certi,ie) % >eri,ie)  
t! e: -ee) \*\* -2 nne\* #er,!r / n-e reCuire / ent( in TIA-837-  
B%2-10 ,r! / 1 MH9 t! 800MH9 t! (u##!rt t2e IEEE 702% n  
(t n) r) ,!r 10 Gig ;it Et2ernet !+er UT\$ C ;\*e

2%8%1%1%5 E -2 10G -!nne-t!ri( t! ,e ture n in!e-ti!n / !\*)e) C!ne !,  
Si\*en-eQ te-2n!\*!g0 t! e'i / in te \*ien -r!((t \*1 @AMTA

2%8%1%1%8 E+er0 10G -!nne-t!r t! in-\*u)e #!\*0 / er (#ring( ;!+e t2e tine(

2%8%1%2%8 IDC #!(t( (2 \*\* e / #\*!0 / e-2 ni( / t! \*\*! ' ,!r ter / in ti!n(

2%8%1%=%3 S2 \*\* ;e te(te) ;0 n ln)e#en)ent te(ting ;!)0 (u-2 ( \*nterte1 @ETLA  
,!r -! /#!nent -! /#!i n-e @i%e% DC! /#!nent r te)DA t! ANS\*4TIA-837  
n) ,!r \$OER ##\*i- ti!n(% Te(t re(u\*t( (2 \*\* ;e #u;\*i(2e) n) #u;\*i-\*0  
+ i\* ;\*e 'it2!ut (#e-i \* reCue(t%

2%8%1%=%7 S2 \*\* ;e in -! /#!i n-e 'i\*\* \*\* N ti!n \* E\*e-tri- \* C!)e(J -! /#!i nt 'it2  
ANS\*4TIA- 1063-A @,!r/er\*0 FCC \$ rt 37AJ -ULu( Li(te)%

\*\* CAT3 n) CAT3A ter / in ti!n( t IDF n) MDF \*!- ti!n(% \$ ne\*(  
(2 \*\* ;e&

2%8%2%1%1 Un(2ie\*)e) ,!r UT\$. n) S2ie\*)e) ,!r FT\$ !r FT\$4UT\$  
-! / ;ine) ##\*i- ti!n(%

2%8%2%1%2 S2ie\*)e) # ne\*( (2 \*\* --e#t ;!t2 (t0\*e( @UT\$4FT\$A !,  
B -1( in t2e ( / e # ne\*. n) (2 \*\* in-\*u)e (t r ' (2er(  
n) gr!un)ing \*ug ,!r ,\*e;i;i\*it0 in # ne\* gr!un)ing. n)4!r  
2 r)' re t! --e#t (t n) r)(--! / #\*i nt gr!un)ing  
-!nne-t!r(%

2%8%2%1%=A+ i\* ;\*e in eit2er 25- !r 57-#!rt( 1RU. !r 57-#!rt 2RU +er(i!n(%

2%8%2%1%5 ln)e#en)ent\*0 te(te) n) +eri,ie) ;0 \*nterte1 @ETLA t! / eet  
!r e:-ee) \*\* TIA -! / #!nent. #er/ nent \*in1. n) -2 nne\*  
reCuire / ent( !, TIA-837 ,!r CAT 8e. CAT 3. n) CAT 3A.  
FCC # rt 37. n) IEC 3030--7% An ##r!#ri te - ;\*e  
/ n ge / ent ; r (2 \*\* ;e in-\*u)e ' it2 (t n) r) )en(it0  
,\* t# ne\*(%

2%8%2%1%8 l ui-1\$!rt Hig2-Den(it0 / !)u\* r# ne\*( (2 \*\* ;e + i\* ;\*e in 57-  
#!rt(41 RU ,!r / , -t!r( ,!r ut2!ri9e) (itu ti!n(%

2%8%2%1%3 S2 \*\* ;e (i9e) t! ,it n EIA (t n) r). 16 in-2 re\* 0 r -1 n) 2!\*e  
# ttern%

2%8%2%1%7 S2 \*\* uti\*i9e uni+er( \* Ge0(t!ne-(t0\*e in(erti!n ,!!t#rint ( t2e  
/ nu, -turerf( / in D,\* g(2i#D \*ine !, #r!)u-t( n) re-ei+e t2e  
( / e B -1( ( re u(e) in t2e ' !r1(t ti!n !ut\*et(% N! (#e-i \*  
D\$ ne\* B -1D (2 \*\* ;e reCuire)%

2%8%2%1%7 >eri,0 ng\*e) !r,\* t# ne\* u(e #er) e(ign) !-u / ent ti!n !r  
+eri,i- ti!n ' it2 O' nerf( Re#re(ent ti+e%

2%8%= FACE\$LATES

2%8%=%1 F -e#\* te( @' \*\*#\* te(A (e-ure in,!r/ ti!n !ut\*et( t! t2e ' !r1 re %  
C!ntr -t!r (2 \*\* #r!+i)e n) in(t \*\* (ing\*e g ng , -e#\* te 1it( t! 2!u(e \*\*  
B -1( ( reCuire) ,!r \*\* ' !r1 re !ut\*et(. ' !r1(tr!t





# TELECOMMUNICATIONS CABLING SYSTEM



2%8%8%=% C ;\*e (2 \*\* ;e \$\*enu /-r te) @CM\$A ,!r n0 \*- ti!n '2ere  
#\*enu / - ;\*e i( reCuire)%

2%8%8%=%5 C !\*!r& B\*ue. !r ( )ire-te)%

2%8%8%=%8 Outer Di / eter& 0%2=0 in-2 / :%

2%8%8%=%3 C ;\*e (2 \*\* ;e gu r ntee) t! e:-ee) \*\* TIA-837 \*in1 n)  
-2 nne\* #er,!r/ n-e reCuire /ent( n) ;e - # ;\*e !,  
(u##!rting 1000B (e-T @702%= ;A n) ISO4IEC 11701 C\* (( E  
##\*i- ti!n( ,!r t!t \* )i(t n-e !, 100 /eter( 'it2 eCui# /ent  
-!r)(%

2%8%8%5 C teg!r0 3 @CAT3A S2ie\*)e) T 'i(te)-\$ ir @FT\$A - ;\*e

2%8%8%5%1 100-O2 / . 2= A ? G. C teg!r0 3 5-# ir ; \* n-e) un(2ie\*)e)  
t 'i(te) # ir (!\*i) nne \*e) -!##er -!n)u-t!r(%

2%8%8%5%2 C ;\*e (2 \*\* ;e gu r ntee) t! 800 MH9 n) UL4ETL Li(te) ;0  
t2e M nu, -turer #rinte) !n t2e - ;\*e B -1et n) # -1 ge. (  
'e\*\* ( ETL >eri,ie) t! TIA-837 C teg!r0 3 n) ISO4IEC 11701

2%8%3%1%1 \$ t-2 -!r) #\*ug (2 \*\* ;e S'i/\*ine. integr te) (n g\*e(( #\*ug  
)e(ign / )e !, in)u(tr0 (t n) r). FCC -! / #\*i nt 65>-0 -\*e r  
/ teri \* ' it2!ut in-!r#!r ting t2e u(e !, ru ; ;er / !\*)e  
!+er; !!t%

2%8%3%1%2 A n rr! ' #r!,i\*e ,!r \*e(( -!nge(ti!n in 2ig2er )en(it0  
##\*i- ti!n( n) -\*e r #\* (ti- (tr in re\*ie, ;!!t en(ure( \*!ng-  
ter/ net' !r1 #er,!r/ n-e

2%8%3%1%= In)e#en)ent\*0 te(te) n) +eri,ie) ;0 \*nterte1 @ETLA ,!r CAT 3A  
-! / #!nent #er,!r/ n-e%

2%8%3%1%5 C ;\*e -!n(tru-ti!n #r!+i)e( e:-e\*\*ent \*ien -r!((t \*1  
(u##re((i!n n) EM\*4RFI #r!te-ti!n%

2%8%3%1%8 C!n(tru-te) !, (2ie\*)e) 23 A?G (tr n)e) -!n)u-t!r - ;\*e,!r  
/ :i/u/ ,\*e:i;i\*it0 n) !ut(i)e)i / eter !, 0%250 in-2. ,!r u(e  
in (2ie\*)e) n) un(2ie\*)e) (0(te / (%

2%8%3%1%3 \$ t-2 -!r) ( in \$\*enu / re ( (2 \*\* ;e \$\*enu / -r te). n)  
uti\*i9e (!i) -!n)u-t!r - ;\*e ' it2 S'i/\*ine (n g\*e(( ;!!t%

2%8%3%1%7 C! / #\*ie( ' it2 TIA 837-C%2-10 -! / #!nent reCuire / ent( ,!r  
-!nne-ting 2 r) ' re ,r! / 1 MH9 t! 800 MH9. ISO 11701  
C\* (( E<sub>A</sub>

2%8%3%2%5 M :i / u / Outer Di / eter !, 0%25 in-2

2%8%3%2%8 \$! ' er !+er Et2ernet @ \$!E n) \$!ERA -! / # ti;\*e

2%8%3%2%3 Su##!rt 1 Gig ;it ##\*i- ti!n( !+er 60- / eter #er / nent \*in1( ' it2 u# t! 10 / eter( !, -!r) ge

2%8%3%2%7 Meet( \*\* ##\*i- ;\*e (t n) r)( n) \*(ting(& ANS\*4TIA-1063-A @,!r/er\*0 FCC \$ rt 37A. R!HS -! / #\*i nt. IEEE 702%=. \$!E& IEEE 702%= t " 2012

2%8%3%2%7 T2e # t-2 -!r) (2 \*\* ;e + i\* ;\*e in 7 (t n) r) -!\*!r(% T0#i- \* CAT3 UT\$ -!\*!r& B\*ue

2%8%3%= St n) r)-)i / eter -!##er # t-2 -!r)(,!r CAT3 FT\$ u(er \*- ti!n( (2 \*\* e:2i;it t2e ,!#! 'ing -2 r -teri(ti-(&

2%8%3%=1 23-g uge. un(2ie\*)e). t' i(te) # ir. (tr n)e) -!n)u-t!r -!n(tru-ti!n ' it2 (t n) r) 7-#!(iti!n / !)u\* r #\*ug !n ;!t2 en)(%

2%8%3%=2 \$\*ug -!nt -t( (2 \*\* ;e #\* te) ' it2 / ini / u / !, 80 / i-r!-in-2e( @< / A !, g!\* )

2%8%3%= S'i / \*ine. integr te) (n g-\*e(( / !\*)e) #\*ug )e(ign ' it2 integr te) (tr in re'ie. ' it2!ut in-!r#!r ting t2e u(e !, n0 (e-!n) r0 !r 2-#ie-e ru; ;er !+er-; !!t%

2%8%3%=5 M :i / u / Outer Di / eter !, 0%25 in-2

2%8%3%=8 \$! ' er !+er Et2ernet @ \$!E n) \$!ERA -! / # ti;\*e

2%8%3%=3 Su##!rt 1 Gig ;it ##\*i- ti!n( !+er 60- / eter #er / nent \*in1( ' it2 u# t! 10 / eter( !, -!r) ge

2%8%3%=7 Meet( \*\* ##\*i- ;\*e (t n) r)( n) \*(ting(& ANS\*4TIA-1063-A @,!r/er\*0 FCC \$ rt 37A. R!HS -! / #\*i nt. IEEE 702%=. \$!E& IEEE 702%= t " 2012

2%8%3%=7 CAT3 FT\$ -!\*!r& Gr 0

2%8%3%5 Hig2-,\*e: -!##er # t-2 -!r)(,!r CAT3 UT\$ - ;\*e (0(te / ( u(e) in(i)e Te\*e-! / En-\*!(ure(. R!! / ( n) r -1( (2 \*\* e:2i;it t2e ,!#! 'ing -2 r -teri(ti-(&

2%8%3%51 27-g uge. un(2ie\*)e). t' i(te) # ir. (tr n)e) -!n)u-t!r -!n(tru-ti!n ' it2 (t n) r) 7-#!(iti!n / !)u\* r #\*ug !n ;!t2 en)(%

2%8%3%52 \$\*ug -!nt -t( (2 \*\* ;e #\* te) ' it2 / ini / u / !, 80 / i-r!-in-2e( @< / A !, g!\* )





en+ir!n / ent in '2i-2 it i( in(t \*\*e) @ln)!!r. ln)!!r4Out)!!r.  
Out(i)e \$\* nt. OFN\$ !r OFNRA%

2%3%=%2%2 Fi;er !#ti- - ;\*e( 'i\*\* uti'i9e n inter\*-1ing r/ !r !uter -!+er  
r!un) n integr te) Tig2t-Bu,,ere) @in)!!r !n\*0A - ;\*e  
-!n(tru-ti!n n) ,i;er (tr n)( 'it2 600 /i-r!n #r!te-ti+e  
(2e t2%

2%3%=%2%= See #\* n( n) (-!#e !, '!r1 ,!r t!t \* (tr n) -!unt ;et 'een  
\*!- ti!n(%)

2%3%=%= MULTIMODE FIBER OPTIC CABLES - FACTORY \$RETERMINATED

2%3%=%%1 O#ti- \* ,i;er - ;\*e( (2 \*\* / eet \*\* !, t2e reCuire / ent(  
)e\*ine te) 'it2in t2e (#e-i,i- ti!n( !, ANSI4TIA-837% C ;\*e(  
/ u(t ;e / ini / u / !, 25 (tr n)( !, 804128</ @ / i-r!nA OM5  
L (er-O#ti / i9e) Mu\*ti-M!)e Fi;er @LOMMFA ,!r ; -1; !ne  
- ;\*ing% C ;\*e( / u(t ;e ##r!#ri te ,!r t2e en+ir!n / ent in  
'2i-2 it i( in(t \*\*e) @ln)!!r. ln)!!r4Out)!!r. OFN\$ !r OFNRA  
;ut re n!t (uit ;\*e ,!r Out(i)e \$\* nt @ eri \* !r un)ergr!un)A%  
B -1; !ne - ;\*e( / 0 ;e u(e) r -1-t!-r -1. MDF-t!-IDF. !r  
(i / i\* r intr ;ui\*)ing ##\*i- ti!n(%)

2%3%=%%2 \$re-ter / in te) ; -1; !ne - ;\*e( 'i\*\* uti'i9e t2e MT\$T  
-!nne-t!r. e / #\*!0ing / u\*ti (tr n) ,erru'e - # ;\*e !,  
(u##!rting 1G. 10G. 50G !r 100G Et2ernet n) ;e0!n)% T2e  
MT\$T -!nne-t!r i( n!t ,ie\*)-in(t \*\* ;\*e -!nne-t!r. n) / u(t  
;e , -t!r0 #!\*i(2e) n) te(te) t! en(ure #re-i(e,i;er \*ign / ent  
n) ,ini(2%

2%3%=%%A\*\* !#ti- \* ,i;er ; -1; !ne - ;\*e( @trun1(



2%3%=%=%= O#ti- \* ,i;er - ;\*e trun1( (2 \*\* 2 +e /ini / u /  
;re 1!ut !, =,eet% A\*\* ,i;er trun1( (2 \*\* uti'i9e 2e t  
(2rin1 t t2e en)( !, \*\* ;re 1!ut( t! -re te ( / !!t2  
;re 1!ut !, t2e ,i;er (u;unit \*eg(%

2%3%=%=%=5 O#ti- \* ,i;er (u;unit( (2 \*\* uti'i9e r!un)  
-!n(tru-ti!n% Ri; ; !n -!n(tru-ti!n i( n!t --e#t ;\*e%

2%3%=%=%=8 A\*\* ,i;er -!nne-t!r( / u(t / eet TIA 305%M ,!r  
-! / # ti; i't0%

2%3%=%=%=3 A\*\* Mu\*ti / ! )e !#ti- \* ,i;er (u;unit( !, 25 (tr n)(  
(2 \*\* uti'i9e t2e 25-(tr n) MT\$ -!nne-t!r% O#ti- \*  
Fi;er (u;unit( !, 12 (tr n)( (2 \*\* uti'i9e 12-(tr n)  
MT\$ -!nne-t!r% N! !#ti- \* ,i;er (u;unit( (2 \*\* ;e  
( / \*\*er t2 n 12 (tr n)( e: -e#t ,!r ,i;er !#ti-  
bu / #er( u(e) ' it2in t2e ( / e r -1(%

2%3%=%=%=7 Mu\*ti / ! )e ,i;er !#ti- trun1( (2 \*\* uti'i9e ,e / \*e MT\$  
-!nne-t!r( 25-(tr n) MT\$ -!nne-t!r( (2 \*\* 2 +e  
Re) ;!!t. n) 12-(tr n) MT\$ (2 \*\* u(e B\* -1 !r  
ACu ;!!t%

2%3%=%=%=7 Sing\*e / ! )e MT\$ -!nne-t!r( (2 \*\* ;e 12-(tr n).  
Ang\*e-\$!\*i(2. n) (2 \*\* 2 +e Green ;!!t%

2%3%=%=%=6 M nu, -turer (2 \*\* #r!+i)e MT\$T ;r n) -!nne-t!r(  
 ,!r (#e-i,i- (u#eri!r #er,!r / n-e -2 r -teri(ti-(%  
Generi- M\$O-(t0\*e -!nne-t!r( re n!t --e#t ;\*e  
Cu \*it0% U(e !, !n\*0 ,erru\*e( !r !t2er e((enti \*  
-! / #!nent( ' i\*\* n!t ;e --e#t ;\*e. ;ut !n\*0 t2e  
-! / #ete MT\$ (0(te / !, -! / #!nent( u(e) t e -2  
-!nne-t!r ((e / ;\*0%

n

2%3%=%=%=10 A\*\* MT\$ -!nne-t!r( (2 \*\* ;e\* (er -\*e +e) t( )0.590251(547A / ) -5

2%3%=%=%=1= A #u\*\*ing e0e (2 \*\* ;e in(t \*\*e) !n !ne en) !, \*\*  
trun1( t! 2e\*#, -i\*it te in(t \*\* ti!n%

2%3%=%=%=15 A\*\* !#ti- \*,i;er trun1( (2 \*\* ;e (2i##e) t! #r!Be-t  
(ite 'it2 nu / ;er !n t2e ;!: t2 t 'i\*\* -!rre(#!n)  
t! t2e \* 0!ut !, t2e , -i\*it0 ,!r e (0 i)enti,i- ti!n ;0  
t2e >en)!r% A\*\* ,i;er trun1( (2 \*\* in-\*u)e #rinte)  
(u / / r0 te(t ,i\*e !, \*\* ,i;er (tr n)( in(i)e t2e ;!:  
,!r t2e >en)!r% A))iti!n \*\*0. t2e M nu, -turer  
(2 \*\* 2!\*) \*\* ,u\*\* te(t ) t unti\* t2e #r!Be-t i(  
-! / #\*ete n) #r!+i)e t2e / t! O 'ner \*!ng 'it2  
t2e ##\*i- ti!n( ((ur n-e ' rr nt0 ,ter t2e  
#r!Be-t i( -! / #\*ete)

2%3%=%=%=18 ln(t \*\* ti!n -!ntr -t!r 'i\*\* re-te(t \*\* ,i;er trun1(  
u#!n -! / #\*ete) in(t \*\* ti!n n) #r!+i)e te(t  
re(u\*( t! M nu, -turer ,!r -! / #\*eti!n !, ,u\*\*  
#r!)u-t ' rr nt0 reCuire / ent(%

2%3%=%=%=13 T2e C!ntr -t!r (2 \*\* ;e re(#!n(i;e ,!r t2e -!rre-t  
,i;er trun1 \*engt2(. -!n,igur ti!n. n) !r)ering%  
Fi;er Trun1 # rt nu / ;er( (2 \*\* ;e gener te) ,r! /  
Le+it!n%-! / On\*ine C!n,igur t!r n) / u(t ;e  
+eri,ie) ' it2 t2e M nu, -turer #ri!r t! !r)ering%

2%3%5 RACG-MOUNT FIBER OPTIC ENCLOSURES. \$ANELS AND TRAYS

2%3%5%1 A\*\* Fi;er en-\*!(ure( (2 \*\* #r!+i)e -r!((-!nne-t. inter -!nne-t. n)  
(#\*i-ing - # ;i\*itie( n) -!nt in - ;\*e / n ge / ent ,!r (u##!rting n)  
r!uting t2e ,i;er - ;\*e(4Bu / #er(%

2%3%5%2 Fi;er A) #ter # ne\* !#ening( (2 \*\* --e#t Fi;er A) #ter \$\* te(  
@;u\*12e )(A. S#\*i-e M!)u\*e( n) #\*ug-n-#\* 0 MT\$ /!)u\*e(4- ((ette( !r  
n0 -! / ;in ti!n t2ere!,%

2%3%5%= 1RU. 2RU n) 5RU en-\*!(ure( (2 \*\* 2!\*) u# t! =. 3 !r 12 ) #ter #\* te(  
!r - ((ette( . re(#e-ti+e\*0%

2%3%5%5 A\*\* Fi;er en-\*!(ure( . # ne\*( n) tr 0( @unit(A (2 \*\* #r!+i)e -r!((-  
-!nne-t. inter--!nne-t. n) (#\*i-ing - # ;i\*itie( n) -!nt in - ;\*e  
/ n ge / ent ,!r (u##!rting n) r!uting t2e ,i;er - ;\*e(4Bu / #er(%

2%3%5%8 Fi;er en-\*!(ure( (2 \*\* e:2i;it t2e ,!\*\* ' ing -2 r -teri(ti-(&

2%3%5%8%1 Fi;er en-\*!(ure( (2 \*\* ;e + i\* ;\*e in 1RU. 2RU !r 5RU +er(i!n(  
t! --! / /!) te ,i;er ) #ter #\* te( . MT\$ M!)u\*e( n)4!r  
ter / in ti!n n) (#\*i-ing !, ,i;er (nee)e)

2%3%5%8%2 En-\*!(ure( (2 \*\* in2erent\*0 --e#t 1-# ne\* integr te) (#\*i-e  
- ((ette%



2%3%8%5 A\*\* Fi;er en-\*(ure(. # ne\*( n) tr 0( @unit(A (2 \*\* #r!+i)e -r!((-  
-!nne-t.inter--!nne-t. n) (#i-ing - # ;i'itie( n) -!nt in - ;\*e

2%3%8%8%7%8 A--e(!r0 1it -!n(i(ting !, >ELCRO ;r n) - ;\*e  
tie(. / !unting (-re' (. - ;\*e / n ger(. #!rt ID  
\* ;e\*(. ;\* n1 #\* te( n) CAM \*!-1 @,!r (#i-e-!n\*0  
en-\*!(ureA

2%3%8%3 Mini ? \*- / !unte) Fi;er En-\*!(ure (2 \*\* e:2i;it t2e ,!#! 'ing  
-2 r -teri(ti-(&

2%3%8%3%1 Fi;er en-\*!(ure (2 \*\* ;e + i\* ;\*e in 3%0 in-2 : 3%8= in-2 : 1%78  
in-2 (i9e t! --! / / ! ) te ,i;er ) #ter #\* te(. MT\$ M!)u\*e(.  
n)4!r ter / in ti!n n) (#i-ing !, ,i;er (nee)e)%

2%3%8%3%2 En-\*!(ure - n ;e !riente) ,!r \*e,t- !r ri

2%3%3 FIBER TERMINATION \$RODUCTS

2%3%3%1 FIBER O\$TIC S\$LICE CASSETTES AND MODULES

2%3%3%1%1 U(e !, ,u(i!n (#\*i-e - ((ette ((e / ;\*ie( 2 \*\* ;e t2e (t n) r)  
/ e n( !, (#\*i-ing ,i;er !#ti- - ;\*e( t t2e en-\*!(ure%

2%3%3%1%2 Fi;er O#ti- S#\*i-e( 2 \*\* ;e ) !ne u(ing ,u(i!n (#\*i-e eCui# / ent%  
Me-2 ni- \* (#\*i-e( re n!t #er / itte)%

2%3%3%1%= S#\*i-e - ((ette( 2 \*\* ;e !,,ere) in 12- !r 25-,i;er LC  
-!n,igur ti!n( in OS2 ,i;er t0#e% C!n(tru-ti!n !, / ! )u\*e (2 \*\*  
;e !, 15-g uge \*u / inu / ,!r r!;u(tne(( n) \*igt2t ' eig2t%

2%3%3%1%5 S#\*i-e - ((ette( 2 \*\* ;e #re-\*! )e) n) r!ute) ' it2 re(#e-ti+e  
=- / eter. -!\*!r--!)e) #igt i\* ((e / ;\*0%

2%3%3%1%8 ln)i+i)u \* OS2 #igt i\*( (2 \*\* 2 +e / :i / u / in(erti!n \*!( ( !,  
0%= )B% Return L!(( (2 \*\* ;e gre ter t2 n 88 )B%

2%3%3%1%3 ln)i+i)u \* -! / # rt / ent( (2 \*\* #r!+i)e (\* -1 (t!r ge n) ;en)  
r )iu( #r!te-ti!n ,!r in-! / ing ; -1;!ne ,i;er(. 600 < / tig2t-  
;u,,er ,i;er(. n) ,u(i!n-(#\*i-e) ,i;er(%

2%3%3%1%7 ln-! / ing 280 < / ; -1;!ne ,i;er( (2 \*\* ;e #r!te-te) ;0  
;r i)e) / e(2 (\*ee+e% He t (2rin1 (t0\*e (#\*i-e (\*ee+e(. ;r i)e)  
/ e(2 (\*ee+e. n) tie 'r #( (2 \*\* ;e in-\*u)e) ' it2 / ! )u\*e%

2%3%3%2 FIBER CONNECTORS

2%3%3%2%1 \$re-#!\*i(2e) ,i;er !#ti- -!nne-t!r( (2 \*\* ;e t2)u\* (3 / e!##;e t2)23 0.109863

2%3%3%2%3 S2 \*\* ;e #r!+i)e in LC. (ing\*e- / ! )e !r / u\*ti / ! )e @\* (er  
!#ti / i9e)A - !n,igur ti!n(. ter / in te) !n 280 !r 600 < /  
;u,,ere) ,i;er n)4!r 2 / / !r = / / B -1ete) ,i;er%

2%3%3%5%= 12- !r 25-(tr n) Sing\*e / !)e Fi;er !#ti- MT\$-LC - ((ette(  
(2 \*\* ;e - !n,igure) ' it2 12-(tr n) MT\$ - !nne-ti!n( in re r%

2%3%3%5%5 T2e MT\$ / !)u\*e( (2 \*\* / eet t2e ,! \*\* ' ing reCuire / ent(&



2%3%3%8%1%3 >eri,0 \*engt2(. Cu ntitle( n) -!n,igur ti!n 'it2  
O 'ner #ri!r t! )e\*i+er0%

2%3%3%8%2 Fi;er-O#ti- MT\$-MT\$ D rr 0 -!r)(D (2 \*\* uti'i9e 7-(tr n) MT\$  
@,e/ \*eA t! 7-(tr n) MT\$ @/ \*eA -!nne-t!r( in =/ / ;re 1!ut  
B -1et% T2e rr 0 -!r)( 'i\*\* / eet t2e ,!#! 'ing reCuire / ent(&

2%3%3%8%2%1 Arr 0 -!r)( (2 \*\* / eet n !#ti- \* in(erti!n \*!( ( n!t  
t! e:-ee) 0%=8 )B #er / te) -!nne-t!r # ir%

2%3%3%8%2%2 Arr 0 -!r)( (2 \*\* ;e + i\* ;\*e in 1-. 2-. =-. 8-. n) 10-  
/ eter \*engt2(%

2%3%3%8%2%= Arr 0 -!r)( (2 \*\* ;e -! / #i nt 'it2 TIA-837-C %=  
n) IEEE 702%=; n) + i\* ;\*e in UL Ri(er !r  
\$\*enu / r te) - ;\*e( @Ri(er i( --e#t ;\*e ,!r in-r -1  
# t-2ingA

2%3%3%8%2%5 Meet( TIA-837-C%= n) IEEE 702%=; (t n) r)(  
@504100G;EA. n) )2ere( t! TIA-652 ) t -enter  
)e(ign gui)e\*ine(%

2%3%3%8%2%8 B! !t -!#!r ,!r 7-(tr n) MT\$ rr 0 -!r)( (2 \*\* ;e D r1  
Gr 0%

2%3%3%8%2%3 MT\$ (2 \*\* ;e #inne) !n !ne en). un#inne) !n t2e  
!t2er. n) uti'i9e Met2!) B #!\* rit0%

2%7 AUDIO >ISUAL SYSTEMS

2%7%1 HDBASE-T DE>ICES

2%7%1%1 GENERAL

2%7%1%1%1 Unit( (2 \*\* ;e -erti,ie) ;0 t2e HDB (eT A\*\*i n-e t! en(ure  
-! / # ti; i!t0 n) #er,!r/ n-e%

2%7%1%1%2 C\* (( 2 E:ten)er( (2 \*\* ;e Certi,ie) t! (u##!rt #\*ug- n)-#\* 0  
in(t \*\* ti!n in-\*u)ing HD +i)e!. / u\*ti--2 nne\* u)i!. ;i-  
)ire-ti!n \*#! 'er. ;i-)ire-ti!n \* IR. n) RS-2=2 -!ntr!\*%

2%7%1%1%= C\* (( 1 E:ten)er( (2 \*\* in-\*u)e (u##!rt ,!r \*\* C\* (( 1  
)e+i-e( 'it2 t2e ))iti!n !, HDB (eT 8\$\* 0Q 100M;  
Et2ernet. u# t! 100 / eter(%

2%7%1%1%5 E:ten)er( (2 \*\* ;e -! / # ti;\*e 'it2 n) 90251(+)-0.95715007(2)0.590251(e)

2%7%1%1%3 Tr n( / itter n) re-ei+er (2 \*\* in-\*u)e #! 'er. !#er ting  
(t tu(. \*in1 n) HDC\$ (t tu( in)i- t!r LED( t! i) in (etu#

2%7%1%1%7 Tr n( / itter n) re-ei+er (2 \*\* ;e FCC \$ rt 18J (u;# rt B.  
C\* (( B -! / #\*i nt

2%7%1%1%7 L! -1ing ,e ture ,!r HDMI n) #! 'er in#ut -!nne-ti!n( (2 \*\*  
;e in-\*u)e) % E:ten)er tr n( / itter n) re-ei+er (2 \*\* 2 +e  
/ et \* en-\*!(ure n) in-\*u)e / !unting ;r -1et(%

2%7%1%5 HDMI4>GA Aut! ( ' it-2ing E :ten)er ? \*\*#\* te

2%7%1%5%1 S2 \*\* ,un-ti!n ( u(er in#ut )e+i-e ,!r (!ur-e A/V eCui# / ent  
' it2 HDMI !r >GA4Au)i! !ut#ut( n) ,!r' r) t2!(e ign \*( t!  
##r!#ri te )i(#\* 0)e+i-e@(A -r!(( n HDB (e-T \*in1%

2%7%1%5%2 ln#ut( (2 \*\* in-\*u)e t' ! @2A HDMI. !ne @1A >GA. n) !ne @1A  
An \*!g Au)i! @,!r >GAA -!nne-ti!n(. !ut#ut (2 \*\* ;e !ne @1A  
RF-58 @HDB (eTA%

2%7%1%5%= ln#ut( (2 \*\* ;e ut! / ti- \*\*0 ( ' it-2e) ;

2%7%1%8 Re / !te S ' it-2ing Mu\*ti;utt!n C!ntr!\* ? \*\*#\* te

2%7%1%8%1 S2 \*\* integr te ' it2 t2e Aut! ( ' it-2ing E:ten)er ? \*\*#\* te t!  
) ) n ) )iti!n \* re / !te -!ntr! \*\*! - ti!n%

2%7%1%8%2 S2 \*\* 2 +e eig2t @7A -!n,igure ;\*e ;utt!n( n) ,it in )u \*-g ng  
,!r / , -t!r%

2%7%1%8%= S2 \*\* ;e \*\* - / et \* -!n(tru-ti!n n) 2 +e / tte n!)i9e)  
\*u / inu / ,ini(2%

2%7%1%8%5 Butt!n( (2 \*\* ;e #re-- !n,igure) ,!r #! ' er !n4!,,, +!\*u / e  
u#4) ! 'n. HD251(2)0.59093 0.590251(4) -5.15007(0590251(4) 55596057(4) 15007



2%7%2%= USB 1%1 E:ten)er Tr n( / itter n) Re-ei+er

2%7%2%=1 USB E:ten)er (2 \*\* e:ten) USB 1%1 (ign \*( ,r! / -! / #uter t!  
)e+i-e !r 2u; u# t! 80 / eter( @135 ,tA !+er (ing\*e - teg!r0-  
r te) - ;\*e%

2%7%2%=2 USB E:ten)er (2 \*\* -! / #\*0 ' it2 USB 1%1 (#e-i,j- ti!n%

2%7%2%= USB E:ten)er (2 \*\* (u##!rt 2ig2-(#ee) 12M;4( n) \*! '-(#ee)  
1%8M;#4( #r!t! -!\*(%

2%7%2%=5 N! e:tern \*#! 'er (2 \*\* ;e reCuire)%

2%7%2%=8 Tr n( / itter (2 \*\* in-\*u)e integr \* 0%=/ @1,tA - ;\*e ,!r ,\*e:i,\*e  
-!nne-ti!n t! -! / #uter #!rt%

2%7%2%=3 Tr n( / itter n) Re-ei+er inter, -e 2!u(ing (2 \*\* ;e / )e !,  
2ig2 i / # -t #\* (ti- n) ;e n! \* rger t2 n 2%83 in-2 L : 1%22 in-2  
? : 0%78 in-2 H%

2%7%2%=7 Tr n( / itter n) re-ei+er (2 \*\* ;e FCC \$ rt 18J (u;# rt B. C\* ((  
B -! / #i nt

## 2%7%= AUDIO AM\$LIFICATION

2%7%=1 Stere! Mi:ing Au)i! A / #i,ier

2%7%=1%1 Mi:ing Au)i! A / #i,ier (2 \*\* in-\*u)e t' ! (tere! u)i! in#ut(  
n) !ne ; \* n-e) / i-r!#2!ne in#ut%

2%7%=1%2 T2e / #i,ier (2 \*\* !,,er t2ree !ut#ut / ! )e(& 2 M 20? (tere! . 1  
M 50? ;ri)ge / !n! . n) 2 M 20? )u \* / !n!%

2%7%=1%= T2ree ( ' it-2 ;\*e in#ut(& t' ! (tere! u)i! n) !ne / i-

2%7%=1%5 T2e / #i,ier (2 \*\* in-\*u)e Mi- / i:er ,un-ti!n ' it2  
in)e#en)ent -!ntr!\*J Mi- in#ut (2 \*\* (u##!rt 57 > #2 nt! /  
#! 'er%

2%7%=1%8 T2e / #i,ier (2 \*\* in-\*u)e \*ine- u)i! !ut#ut B -1 ' it2  
-!ntr!\*\* ;\*e +!\*u / e. +!\*u / e. ; ((. tre;\*e. n) / ute -!ntr!\*(  
n) ut! !ut#ut / ute !n n! in#ut%

2%7%=1%3 T2e / #i,ier (2 \*\* 2 +e 20H9 - 20GH9 ,reCuen-0 re(#!n(e  
r nge

2%7%=1%7 T2e / #i,ier (2 \*\* in-\*u)e LED in)i- t!r( ,!r #! 'er n) -!ntr!\*  
,un-ti!n ,ee) ; -1%

2%7%=%1%6 T2e / #\*i,ier (2 \*\* in-\*u)e \*!-1ing #! 'er (u##\*0 -!nne-t!r

2%7%5%2%2 C!nne-t!r( (2 \*\* ;e )ie - (t. l ui-1#!rt @Ge0(t!neA ,!!t#rint.  
n) ,it in n0 , -e#\* te. ;i(-uit ;!-1 !r -ei'ing4 ;! : / !unt  
#r!+i)e) ,!r in t2i( S#e-i,i- ti!n%

2%7%5%2%= C!nne-t!r / ! )u\*e (2 \*\* ;e UL 205= \$\*enu / Certi,ie)% ? iring  
(2 \*\* ;e uni+er( \* n) 'i\*\* --! / /!) te ;!t2 T837A n)  
T837B # ir4#in ((ign / ent(%

2%7%5%2%5 C!nne-t!r M!)u\*e (2 \*\* ;e (u##\*ie) ' it2 inter-2 nge ;\*e  
i-!n( @+!i-e. ) t . A4>. n) ;\* n1. -! \*!r -!)e) t! / t-2 t2e  
-!nne-t!r , -eA ,!r e (0i)enti,i- ti!n n) tr -1ing !, ) t .  
+!i-e. !r !t2er ,un-ti!n( n) (2 \*\* ;e + i\* ;\*e in 1= )i,,erent  
-! \*!r(%

2%7%5%= HDMI C!nne-t!r(

2%7%5%=1 HDMI # ((-t2r!ug2 -!nne-t!r( \* n)ing in , -e#\* te( (2 \*\* ,it  
(urr!un)ing -!nne-t!r( in t2e ( / e l ui-1#!rt 1e0(t!ne-(t0'e  
)e+i-e #\* te%

2%7%5%5 HDB (eT C!r)(

2%7%5%5%1 C teg!r0 3A C! / #!nent r te) S\*i / \*ine \$ t-2 C!r)( ( )  
)e(-ri;e) ;!+e in H!ri9!nt \* C ;\*ing (e-ti!n (2 \*\* ;e u(e) ,!r  
HDB (eT inter-!nne-ti!n( in t2e tr n(iti!n ,r! / HDMI !r >GA  
int! UT\$ - ;\*ing%

2%7%5%8 HDMI C ;\*e A((e / ;\*ie(

2%7%5%8%1 C ;\*e (2 \*\* ;e Hig2-S#ee) HDMI ' it2 Et2ernet n) (2 \*\* ;e  
HDMI -erti,ie)%

2%7%5%8%2 T2e - ;\*e (2 \*\* ;e r te) CL2 ,!r in- ' \*\* in(t \*\* ti!n(. ;e -ULu(  
Li(te) t! UL 173= n) CAN4CSA C22%2 N!% 2==06%

2%7%5%8%= HDMI - ;\*e( (2 \*\* ;e / nu, -ture) ' it2 g!\*) #\* te) T0#e A  
/ \*e HDMI -!nne-t!r( ' it2 / !\*)e) T\$E -!nne-t!r !uter ;!)0%

2%7%5%8%5 HDMI - ;\*e( (2 \*\* ;e / nu, -ture) ' it2 27g -!n)u-t!r( n)  
2 +e n !ut(i)e)i / eter !, n! gre ter t2 n 0%27 in-2

2%7%5%8%8 HDMI - ;\*e( (2 \*\* (u##!rt Au)i! Return C2 nne\*%

2%7%5%8%3 HDMI - ;\*e( (2 \*\* ;e + i\* ;\*e ' it2 !#ti!n \* uni+er( \*\*!-1ing  
1it ,!r ) #ting t! ' i)er nge !, HDMI -!nne-t!r !+er / !\*)  
(i9e(% L!-1ing 1it (2 \*\* in-\*u)e ;!t2 M=M0%8 n) 50-50UNC  
(-re' (%



2%7 FRAMES, RACGS AND CABINETS

2%7%1 FLOOR-MOUNTED 5-\$OST RACGS

2%7%1%1 O#en 16 in-2 5-#!(t,r / e 'it2 L12-25 t ##e) 2!\*e e:tru)e) \*u / inu /  
/ !unting r i\*( )e(igne) t! #r!+i)e ne r\*0 =30 )egree( !, --e((i;i\*it0  
n) unre(tri-te) ir,\*! '%

2%7%1%2 75 in-2 @21== / / A 58RMU 2eig2t ' it2 EIA4ECA==10-E uni+er( \* 847 in-2  
@13 / / A. 847 in-2 @13 / / A. W in-2 @1= / / A 2!\*e # ttern% \$er / nent\*0  
(t / #e) r -1 / !unt unit @RMUA / r1ing( n) @100A L12-25 / !unting  
(-re ' ( in-\*u)e)%

2%7%1%= De#t2 )Bu(t ;\*e in 1 in-2 @28%5 / / A in-re / ent( ,r! / =0 in-2 @732 / / A  
t! =3 in-2 @615 / / A !+er \*\* )e#t2%

2%7%1%5 L! ) R ting& 2000 \*;% @6071gA - # -it0. e+en\*0 )i(tri;ute) \*!ng r -1  
2eig2t%

2%7%1%8 UL Li(te) t! t2e UL30680 St n) r) - Fi\*e N!% E1716=3%

2%7%2 FLOOR-MOUNTED 2-\$OST RACGS

2%7%2%1 Uni+er( \* Bun-ti!n 2!\*e # ttern / t-2e( / !(t / nu, -turer(r -1(% L12-  
25 # ne\* / !unting 2!\*e(% C!n,!r / n-e t! EIA4ECA==10-E n) UL  
Li(te) @Fi\*e N!% E1716=3A ( -! / / uni- ti!n( -ir-uit --e((!r0%

2%7%2%2 L! ) R ting& 1200 L; (% @8551gA ' eig2t - # -it0 ' 2en e+en\*0 )i(tri;ute)  
,!r t2e 2eig2t !, t2e r -1 @75 in-2 @21== / / A n) (2!rterA%

2%7%2%= M teri \*& A\*u / inu / % T' in t!# ng\*e( ,!r rigi)it0%

2%7%2%5 A)) @1A,r!nt4re r +erti- \* 'ire / n ger !n e -2 (i)e !r ;et' een r -1(%  
See ?ire M n ge / ent. ;e\*! '%

2%7%2%8 \$er / nent\*0 (t / #e) r -1 / !unt unit @RMUA / r1ing( in-\*u)e)% D!u;\*e  
(i)e uni+er( \* @847 in-2 @13 / / A. 847 in-2 @13 / / A. W in-2 @1= / / AA  
/ !unting (# -ing%

2%7%2%3 In-\*u)e( =0 )!g #!int -! / ;! 2e ) @\$2i\*\*i#( n) ,\* t ;\* )eA / !unting  
(-re ' (%

2%7%2%7 T ##e) ((e / ;\*0 2!\*e( e\*i / in te t2e nee) ,!r nut( n) (i / #\*i,ie(  
((e / ;\*0 n) (Cu ring%

2%7%= ? ALL-MOUNTED CABINETS

2%7%=1 16RU u( ;\*e =3 in-2 t \*\*. =0 in-2 )e#t2. 25 in-2 ' i)e. 16 in-2 2!\*e  
# ttern. \*!-1ing \$\*e:ig\* (( )!!r

2%7%=%2 En-\*(ure ,e ture( ,u\*\*0 'e\*)e). 13 g uge @1%8 / / A -!\*) r!\*\*e) (tee\*  
-!n(tru-ti!n%

2%7%=% M!unt( t! ' \*\* ( \*e,t 2inge) !r rig2t 2inge) !#ening 'it2 He +0 )ut0.  
,ie\*) re+er(i;\*e 2inge n) \*!-1 (0(te / %

2%7%=%5 Re r (e-ti!n - ne (i\*0 ;e (e# r te) ,r! / t2e - ;inet ,!r (i / #\*e  
in(t \*\* ti!n !nt! ' \*\* n) re r (e-ti!n( ,e ture re / !+ ;\*e #\* te( 'it2  
eit2er / u\*ti#\*e 1n! -1!ut( ,!r -!n)uit !r ;u(2ing in(t \*\* ti!n. !r 2ig2-  
)en(it0 ,! / g\* n) #\* te ,!r e (e !, in(t \*\*ing #re-ter / in te) # t-2  
# ne\*(%

2%7%=%8 G\* n) \$\* te Git (2 \*\* ;e + i\* ;\*e t! ) #t - ;inet t! ,it !+er e:i(ting  
in(t \*\*e) !r ter / in te) - ;\*e. ( nee)e)%

2%7%=%3 \$r!+(i!ne) ,!r 13 in-2 @503 / / A !n--enter / !unting n) / u\*ti#\*e 'ire  
/ n ge / ent\* n-e( ,!r - ;\*e tie #!int( !r --e((!r0 / !unting% \$r!+i)e  
!ne >erti- \* - ;\*e\* -ing ; r ,!r e -2 ' \*\* / !unt - ;inet

2%7%=%7 Fu\*\*0 )Bu(t ;\*e EIA4ECA=-10-E -! / #\*i nt / !unting r i\* (0(te / 'it2  
L12-25 t ##e) r i\*(% UL \*i(te) t! t2e UL30680

2%7%=%7 =3 in-2 @615 / / A 2ig2 - ;inet( r te) ,!r 200\* ; @611gA \*! )J 57 in-2  
@1216 / / A 2ig2 - ;inet( re r te) ,!r =00\* ; @1=31gA \*! )% =3L - ;inet i(  
(t n) r). u(e 57 in-2 ( reCuire)%

2%7%5 >ERTICAL ? IRE MANAGERS

2%7%5%1 \$r!+i)e ,u\*\* 2eig2t. ,r!nt- n)-re r. 7 in-2 'i)e >erti- \* ? ire M n ger( t  
t2e (i)e !, n) ;et' een e -2 2-#!(t n)4!r 5-#!(t ter / in ti!n r -1 !r  
,r / e% l, (# -e 'i\*\* n!t \*\*!'. t2e 8 in-2 'i)e 'ire / n ger / 0 ;e  
(u ;(titude) t r! ' en) ( !n\*0. \*e +ing t2e 7 in-2 +erti- \* 'ire / n ger  
;et' een e -2 r -1% O'ner ##r!+ \* in ' riting i( reCuire) #r!r t! t2i(  
(u ;(tituti!n%

2%7%5%1%1 T2e +erti- \* - ;\*e / n ge / ent (0(te / (2 \*\* ;e -ULu( \*i(te).  
\$Cl r te) ,!r 65>-O. ABS r te) ,!r UL65HB. n) -! / #\*i nt  
' it2 ANS\*4TIA4EIA 837-B (t n) r)(%

2%7%5%1%2 M!unting 2 r) ' re (2 \*\* ;e in-\*u)e) t! in(ure t2e #r!#er  
in(t \*\* ti!n t! in,r (tru-ture% lt (2 \*\* / !unt !nt! (t n) r)  
TIA4EIA re- !gni9e) eCui# / ent r -1%

2%7%5%1%= T2e / n ge / ent (0(te / (2 \*\* !,er n ((!rt / ent !,  
--e((!rie(. in-\*u)ing ;en) r )iu( (\* -1\*! !# !rg ni9er.  
- ;\*e ret iner( n) (2 \*\* --! / /!) te t!#. ;!tt! / . (i)e n)  
# ((-t2r!ug2 - ;\*e r!uting% Du \* 2inge). - ;\*e -!n-e \*ing  
-!+er( (2 \*\* ;e in-\*u)e)%

2%7%8 HORIZONTAL ?IRE MANAGERS -

2%7%8%1 \$r!+i)e 2RU )u-t-(t0\*e 2!ri9!nt \* 'ire / n ger( ;!+e n) ;e\*! ' !r  
;et' een e+er0 2RU !, # t-2 # ne\*. ( (# -e \*\*! ' (%)

2%7%8%1%1 C ;\*e / n ger( (2 \*\* ;e,\* t. -!+ere) )u-t (t0\*e 'it2,r!nt n)  
re r-2 nne\*(%)

2%7%8%1%2 D! n!t -!i\* !r 'in) # t-2 -!r)( in(i)e 'ire / n ger(%)

2%7%8%1%=U(e re-e((e) ,\* t 'ire / n ger (nee)e) 'it2in en-\*(e)  
- ;inet( t! r!ute # t-2 -!r)( t! !##!(ite (i)e(. '2ere t2e ring(  
!, t2e,\* t 'ire / n ger( '!u\*) inter,ere 'it2 - ;inet)!!r  
-\*(ure%)

2%6 CABLE SU\$\$ORTS

2%6%1 F-HOOGS

2%6%1%1 A\*\* - ;\*e (2 \*\* ;e (u##!rte) ;!+e -ei'ing !n)e)i- te) - ;\*e (u##!rt  
2 r)' re%

2%6%1%2 C ;\*e ( ))\*e( n) F-2!!1( (2 \*\* ;e u(e) '2ere - ;\*e tr 0 !r 'ire  
; (1et i(n!t + i\* ;\*e T2e(e / u(t ;e (u##!rte) !n t2eir ! 'n -ei'ing  
'ire(. t2re )e r!). !r ,;i:e) t! ;ui\*)ing (tru-ture ;0 u(e !, ;e /  
-\* /#@!n /et \* ;e / (A !r '!!) (-re' ( @!n '!!) ;e / (A% A,,i:ing  
-! / /uni- ti!n - ;\*e (u##!rt( t! e:i(ting -ei'ing (u##!rt 'ire( i( n!t  
\*\*! 'e)%

2%6%2 CABLE TRAY

2%6%2%1 In Te\*e-! / R!! / (. - ;\*e tr 0 @\* )er run' 0A (2 \*\* ;e in(t \*\*e) t!  
(u##!rt \*\* - ;\*e running t! r -1( n) - ;inet(%)

2%6%2%2 C ;\*e tr 0 t! ;e )e) t! \*\* Te\*e-! / R!! / ( in #\* -e( '2ere - ;\*e i( run  
2!ri9!nt \*\*0%

2%6%= FACG4OUTLET BRACGETS

2%6%1 A; !+e--ei'ing - ;\*e ter / in ti!n \*- ti!n( (2 \*\* ;e eit2er ' \*\*-/ !unte) !r  
(u(#en)e),r! / (tru-ture ;!+e t2e)r!# -ei'ing% C ;\*e( !r ter / in ti!n(  
(2 \*\* n!t re(t !n -ei'ing gri) !r eCui# / ent ;!+e -ei'ing gri)%

2%6%2 F!r ? ire\*e(( A--e(( \$!int( n) !t2er ;!+e--ei'ing- / !unte)  
-! / / uni- ti!n( )e+i-e(. - ;\*e( (2 \*\* n) in n ;!+e--ei'ing ;r -1et  
'2i-2 i( ,i:e) t! )e)i- te) - ;\*e (u##!rt 2 r) ' re%

2%6%3 T' ! - teg!r0-r te) B -1( / 0 ;e in(t \*\*e) in e -2 ;!+e--ei'ing  
;r -1et% E -2 ;!+e- ei'ing ;r -1et 'i\*\* 2!\*) 2-#!rt Sur, -e-M!unt  
B!: !r 1-U MOS SMB ,!r / u\*ti / e)i ##\*i- ti!n(%

2%6%5 F!r ' \*\*-/ !unte) )e+i-e \*- ti!n( @ ;!+e !r ;e\*! ' -ei'ingA. )e+i-e(  
nee)ing t! ;e / !unte) )ire-t\*0 t! ; -1;! : 'i\*\* uti'i9e t2e in- ' \*\*  
/ !unting ;r -1et t! (e-ure t2e B -1 in(i)e t2e ; -1;! : %

2%6%8 One - teg!r0-r te) B -1 - n ;e in(t \*\*e) in e -2 in- ' \*\* ; -1;! : B -1  
/ !unting ;r -1et% F!r )e+i-e( reCuring @2A - teg!r0-r te) B -1(. @2A in-  
' \*\* ;r -1et( / u(t ;e u(e)%

2%10 \$O ? ER DISTRIBUTION UNITS @\$DUA

2%10%1 \$r!+i)e @1A \$DU #err -1 !r ' \*\* - ;inet% Un(' it-2e). n!n-(urge (u##re((e)%  
16 in-2 H!ri9!nt \*,!r ' \*\* - ;inet( n) 57 in-2 >erti- \*,!r ,\*!!r- / !unte)  
- ;inet(%

2%10%2 Uti'i9e #\*ug n) re-e#t -\*e (t0\*e ##r!#ri te ,!r in(t \*\* ti!n -ir-uit( n)  
eCui# / ent inter, -e(%

2%11 FIRESTO\$\$ING

2%11%1 Fire r te) # t2' 0 )e+i-e( (2 \*\* ;e t2e #re,



2%12%1%2 C ;\*e \* ;e\*( 2 \*\* ;e / -2ine-gener te) 'r #- r!un) \* ;e\*( 'it2  
/u\*ti#\*e - ;\*e IDP( #rinte) (u-2 t2 t it - n ;e +ie ' ;\*e in #\* -e 'it2!ut  
turning t2e - ;\*e%

=%1%1%12 Tr ining  
=%1%1%1= C\*e ning  
=%1%1%15 \$r!Be-t C\*(e!ut

=%2 CABLE HANDLING I CABLE MANAGEMENT

=%2%1 \$r!#er - ;\*e 2 n)\*ing i( -riti- \*t! / int ining t2e )e(ign integrit0 !, 2ig2-  
#er,!r/ n-e - ;\*ing% C ;\*e 2 n)\*ing re-! / / en) ti!n( in-\*u)e&

=%2%1%1 C ;\*e / u(t ;e -!n)iti!ne) ;!+e =2 )egree( F ,!r 57 2!ur( #ri!r t!  
in(t \*\* ti!n%

=%2%1%2 D! n!t u(e e:-e((i+e,!r-e '2en #u\*\*ing - ;\*e% T2e / :i/u/ #u\*\*-,!r-e  
gui)e\*ine,!r 5-# ir 2!ri9!nt \* UT\$ (2!u\*) n!t e:-ee) 110N @28\*; ,A%  
Meeting t2i( gui)e\*ine +!i)( (tret-2ing -!n)u-t!r( )uring in(t \*\* ti!n  
n) t2e ((!-i te) tr n(/i((i!n)egr ) ti!n%

=%2%1%= T2e / ini / u / ;en) r )iu( ,!r UT\$ (2!u\*) n!t e:-ee) 5 ti / e( t2e - ;\*e  
!ut(i)e)i / eter @O%D%A T2e O%D% !, CAT 3A 100 !2 / . ; \* n-e) UT\$  
- ;\*e i( %=0 in% @5 : %= X 1%2 in% ;en) r )iu(A%

=%2%1%5 T2e / ini / u / ;en) r )iu( ,!r ;er (2!u\*) n!t e:-ee) 10: t2e - ;\*e  
!ut(i)e)i / eter%

=%2%1%8 Tr )iti!n \* -! / ;ing n) )re((ing @;un)\*ingA !, C teg!r0 3 n) 3A  
- ;\*ing ,!r -! / ;e) ##e r n-e-i( reCuire) in \*\*e:#!(e) \*- ti!n( %

=%2%1%3 In TR. u(e ##r!#ri te 2!ri9!nt \* - ;\*e / n ge/ent ,!r # t-2 -!r)( !n  
,r!nt !, # t-2 # ne\*(% A\*(! .u(e ##r!#ri te - ;\*e / n ge/ent ; r@A ,!r  
(u##!rt !, ter / in te) 2!ri9!nt \* - ;\*e%

=%2%1%7 D! n!t u(e +in0\* !r #\* (ti- - ;\*e tie( )ue t! t2e #!tenti \* ,!r !+er-  
-in-2ing !, - ;\*e ;un)\*e( '2i-2 - n \*ter t2e - ;\*e ge! / etr0 n)  
)egr )e t2e (0(te / - ;\*ing #er,!r/ n-e% U(e !n\*0 2!!1 n) \*!!#  
@D>e\*-r!DA , (tener( ,!r ;un)\*ing !, 2!ri9!nt \* - ;\*e( %

=%2%1%7 St!re - ;\*e (\* -1 in n e:ten)e) \*!!# -!n,igur ti!n t! \*\*e+i te - ;\*e  
(tre((% E:-e((i+e - ;\*e (\* -1 in ;un)\*e) \*!!#( !r tr )iti!n \* E(er+i-e  
\*!!#(E t! #r!+i)e )iti!n \* - ;\*e \*engt2 in TR 2 ( ;een (2! ' n t!  
)egr )e - ;\*ing #er,!r/ n-e n) re n!t re-! / / en)e)%

=%= SE\$ARATION OF DATA AND \$O ? ER CABLING

=%=1 De(ign - ;\*e # t2' 0( t! +!i) #!tenti \* (!ur-e( !, EMI% A+!i) in(t \*\*ing - ;\*e  
ne r (!ur-e( !, EMI @M-r 0 eCui# / ent. \* rge / !t!r(4gener t!r(. e\*e-tri- \*  
#! ' er - ;\*ing n) tr n(,!r / er(. R )i! ,reCuen-0 @RFA (!ur-e( n)  
tr n( / itter(. \*ig2ting. -!#ier(. et-%A%

=%=%2 \$20(i- \*\*0 (e# r te#! 'er n) ) t - ;\*ing --!r)ing t! re\*e+ nt -!)e n)  
(t n) r) reCuire / ent( '2en run in -! / / !n# t2' 0%

=%=%2%1 Ne+er run ) t n) C\* (( 1#! 'er - ;\*ing in # r \*\*e\* -\*(er t2 n 2 in-2%

=%=%2%2 A+!i) -r!((ing - ;\*e( i,#!((i;\*e%l, ne-e(( r0. \*\* 0(-r!((- ;\*e( t 60  
)egree(%)

=%=%2%= M int in /ini/u/ !, 8 in-2 (e# r ti!n ;et'een ) t - ;\*e n) \*\*  
; \*\* (t -!ntr!\*\*e) \*ig2ting%

=%=%= Mini /u/ (e# r ti!n)i(t n-e( !, te'e-! / /uni- ti!n( - ;\*ing ,r! / #!tenti \*  
(!ur-e( !, EMI e:-ee)ing 81>A&

=%=%%1 25 in-2e( ' 0,r! / Un(2ie\*)e)#! 'er \*ine( !r e\*e-tri- \* eCui# / ent in  
#r!:i/it0 t! !#en !r n!n/et \* # t2' 0(

=%=%%2 12 in-2e( ' 0,r! / Un(2ie\*)e)#! 'er \*ine( !r e\*e-tri- \* eCui# / ent in  
#r!:i/it0 t! gr!un)e) / et \* -!n)uit # t2' 0

=%=%%3 3 in-2e( ' 0,r! / \$!'er \*ine( en-\*(e) in gr!un)e) / et \* -!n)uit  
@!r eCui+ \*ent (2ie\*)ingA in #r!:i/it0 t! gr!un)e) / et \* -!n)uit  
# t2' 0

=%=%%5 57 in-2e( ' 0,r! / E\*e-tri- \* / !t!r( n) tr n(,!r/er(

=%5 INSTALLATION OF STRUCTURED CABLING SYSTEM

=%5%1 \$RE-INSTALLATION CONFERENCE

=%5%1%1 S-2e)u\*e -!n,eren-e /ini/u/ !, ,i+e @8A - \*en) r ) 0( #ri!r t!  
;eginning ' !r1 !, t2i( (e-ti!n%

=%5%1%2 Agen) & C\* ri,0 Cue(ti!n( re\* te) t! ' !r1 t! ;e #er,!r/ e). (-2e)u'ing.  
-!!r)in ti!n. et-%

=%5%1%= Atten) n-e& C! / /uni- ti!n( (0(te/ in(t \*\*er. Gener \* C!ntr -t!r.  
O'ner( Re#re(ent ti+e( n) n0 ))iti!n \* # rtie( ,,e-te) ;0 ' !r1 !,  
t2i( (e-ti!n% O'ner:( ln,!r/ ti!n Te-2n!\*!g0 / u(t ;e re#re(ente) t  
#re-!n,eren-e / eeting #ri!r t! (-2e)u'ing !, n0 ' !r1%

=%5%1%5 C!#0 !, Le+it!n ' rr nt0 ##\*i- ti!n 'i\*\* ;e #r!+i)e) ;0 C!ntr -t!r%

=%5%1%8 \$re-ln(t \*\* ti!n -!n,eren-e / 0 ;e ' i+e) !n\*0 ;0 O'ner%

=%5%2 ?ARRANTY

=%5%2%1 A \*i,eti/ e #er,!r/ n-e ' rr nt0 -!+ering \*\* -! / #!nent(. eCui# / ent  
n) ' !r1 / n(2i# (2 \*\* ;e (u; / itte) in 'riting ' it2 (0(te /  
)!-u/ent ti!n% T2e ' rr nt0 #eri!) (2 \*\* ;egin !n t2e (0(te / E( ,ir(t u(e  
;0 t2e O'ner%





5 O ? NER RE IUIREMENTS AND STANDARDS

YT2i( (e-ti!n 'i\* -2 nge ; (e) !n !'ner (t n) r)( n) #r -ti-e(Z

5%1 A /ini / u / !, F!ur @5A CAT3A UT\$ - ;\*e( n) B -1( @2 D t . 2 >!i-eA  
(2 \*\* ;e in(t \*\*e) in \*\* (t n) r) ' !r1 re !ut\*et \*- ti!n( !n 3-!ut\*et  
,\*u(2 / !unte) , -e#\* te. in-\*u)ing !,,i-e(. uti\*it0 (er+i-e( n) !t2er  
-! / / !n te\*e-! / / uni- ti!n( \*- ti!n(% F -1 -!n,igur ti!n( 'i\*\* ;e  
>!i-e #!(iti!ne) t t2e t!# !, t2e , -e#\* te n) D t i( t! ;e #!(iti!ne)  
t t2e ; !tt / !, t2e , -e#\* te T2e t' ! -enter #!(iti!n( re t! re / in  
;\* n1 ,!r ,uture u(e%

5%2 A\*\* / !)u\* r,urniture 'i\*\* 2 +e (ing\*e ' !r1(t ti!n !ut\*et #er -u; i-\*e.  
un\*e(( #e-i,i- \*\*0 n!te) !t2er 'i(e A\*\* # rti!n-' \*\* !r) e / i(ing- ' \*\*e)  
re (2 +e ' !r1(t ti!n !ut\*et( #e-i,i- \*\*0 n!te) !n t2e E:2i; it 4F\* !r  
\$\* n(%

5% T' ! @2A CAT3A UT\$ - ;\*e( n) B -1( (2 \*\* ;e in(t \*\*e) t \*\* ?ire\*e((  
A- -e(( \$!int \*- ti!n(% Se-urit0 - /er n) A> !Mu\*ti / e) i \*- ti!n(  
\*( !reCuire CAT3A - ;\*e( n) B -1(. ;ut / 0 reCuire ,e' er !r / !re  
- ;\*e(% Re,er t! )r 'ing( ,!r (#e-i,i- )et i\*(%

5% ? \*\*#2!ne !ut\*et \*- ti!n( reCuire (ing\*e - ;\*e n) B -1 !n (t in\*e((  
(tee\* (tu) e) ' \*\*#\* te% Ot2er \*- ti!n( / 0 reCuire / !re - ;\*e( n)  
B -1 !ut\*et(% Re,er t! )r 'ing( ,!r (#e-i,i- )et i\*(%

5%8 D t B -1 L1 (2 \*\* ;e ORANGE. D t B -1 L2 (2 \*\* ;e BLUE% >!i-e  
B -1( (2 \*\* ;e l>ORY% A\*\* ter / in ti!n 'iring (2 \*\* ;e T837B%

5%3 A /ini / u / !, 5- 5 in-2 (\*ee+e( / u(t ;e #re(ent in e -2 IDF% S\*ee+e(  
,!r #enetr ti!n !, ' \*\* ( n) ,!r( (2 \*\* 2 +e 100 #er-ent (# re  
- # -it0 n) (2 \*\* ;e ,ire-(t!##e) ( #er -!)e% C!ntr -t!ri(t! #r!+i)e  
)iti!n \* (\*ee+e( i, t2e r!! / ( ) !n!t / eet !r e:-ee) / ini / u /  
reCuire / ent(

5 \$ATH ? AYS AND TO\$OLOGY

5%8%1 Uti\*i9e Dt2in ,i\* / D \*u; ri- nt( !n\*0[ lt 2 ( ;een (2! ' n t2 t - ;\*e-#i\*\*ing  
\*u; ri- nt( 'i\*\* ,,e-t 0!ur te(ting ( t2e - ;\*e nee)( (e+er \* ' ee1( t! )r0  
;e,!re ttenu ti!n \*e+e\*( re-!+er% U(e !, in-!rre-t - ;\*e \*u; ri- nt( 'i\*\*  
er!)e - ;\*e B -1et n) +!i) - ;\*e ' rr nt0%

5%8%2 A\*\* - ;\*e n) 'ire (2 \*\* ;e -!n-e \*e) in -!n)uit(. ,!r)u-t(. # ne\*ing.  
-e\*ing !r (i/i\* r re (e:-e#t t / utu \*\*0 gree) u# !n re (%)

5%8%= Fi\*\* - # -it0 in -!n)uit. / !)u\* r,urniture n) !t2er 2!ri9!nt \* # t2' 0(  
(2!u\*) n!t e:-ee) 50 #er-ent% A / :i / u / !, 30 #er-ent # t2' 0 ,i\*\* i(  
\*\*! 'e) t! --! / / !) te un#\* nne) )iti!n( ,ter initi \* in(t \*\* ti!n%  
T2e CAT 3A - ;\*e i( \* rger O%D% @0%278 in-2 - 0%=0 in-2 +(% 0%2= in-2  
,!r t0#i- \* ,!r CAT3 - ;\*eA% T2e in-re (e) )i / eter !, CAT 3A - ;\*e 'i\*\*  
reCuire ##r!#ri te)e(ign -!n(i)er ti!n( '2en (i9ing -!n)uit n) !t2er

# t2' 0(% ln / !(t in(t \*\* ti!n(. -!n)uit (i9e( 'i\*\* 2 +e t! ;e in-re (e) in  
!r)ert! --! / /!) te \*\*!, t2e - ;\*e( ;eing in(t \*\*e)% T2i( 'i\*\* i/# -t  
t2e )e(ign n) / teri \* (e\*e-ti!n!, t2e #r!#e-t% T! - \*-u\* te t2e,i\*\* r ti!  
)i+i)e t2e (u/ !, t2e -r!((-e-ti!n \* re !, \*\* - ;\*e(. ;0 t2e / !(t  
re(tri-te) -r!((-e-ti!n \* re !, t2e # t2' 0%

=%5%8%5 Fi\*\* r ti! ( ,!r Aug / ente) CAT3 - ;\*e @CAT3AA reCuire( 1 in-2 EMT ,!r 5  
- ;\*e( n) (i9e) \* rger ,!r ))iti!n \* - ;\*e( ( reCuire) t! / int in 30  
#er-ent ,i\*\* r ti!%

=%5%8%8 F\* t-rung n)4!r (!i) ;!tt! / - ;\*e tr 0 (2 \*\* ;e uti\*i9e) ,!r \* rge. 2ig2-  
)en(it0 in(t \*\* ti!n(% F-2!!1( n) !t2er (#e-i,i- - ;\*e (u##!rt 2 r) ' re  
(2 \*\* ;e u(e) t \*\*!- ti!n( !ut(i)e !, - ;\*e tr 0%

=%5%8%3 \$ t2' 0)e(ign (2!u\*) n!t e:-ee) t' ! @2A 60 )egree ;en)( ;et' een  
#u\*\*#!int( !r #u\*\* ;!:e( @\$BA% l, / !re t2 n t' ! @2A 60 )egree ;en)( re  
reCuire). in(t \*\* #u\*\* ;!: ;et' een ;en)(%

=%5%8%7 \$r!+i)e NEC-(i9e) #u\*\* ;!:e( ,!r n0 run gre ter t2 n 100 ,eet. !r ' it2  
/ !re t2 n t' ! 60 )egree ;en)(%

=%5%8%7 F-2!!1( (2!u\*) ;e r n) ! / \*0 (# -e) 30 in-2 !r \*e((% D! n!t e:-ee) F-  
2!!1 - # -it0 ,!r (i9e n) ' eig2t \*i/ it ti!n(%

# TELECOMMUNICATIONS CABLING SYSTEM

=%5%8%2= C!ntr -t!r (2 \*\* ,ire(t!# \*\* u(e) # t2' 0( '2i-2 enter !r\*e +e t2e  
te\*e-! / r!! / ( +i -!n)uit. - ;\*e tr 0 !r (\*!t% C!ntr -t!r i( re(#!n(i;\*e  
,!r in(t \*\*ing (\*ee+e( t e -2 ' \*\* !r# rti!n #enetr ti!n. n)

=%5%3%7 E\*e-tri-i n 'i\* #r!+i)e -!nne-ti!n ;et' een TGB n) ;ui\*)ing gr!un)J  
Te\*e-! / C!ntr -t!r @i, (e# r te. !t2er 'i(e e\*e-tri-i nA 'i\* #r!+i)e  
;u(; r n) gr!un) \*\* eCui#/ent n) te\*e-! / / et \*( t! t2e ;u(; r%

=%5%3%6 Te\*e-! / in(t \*\*er 'i\*\* gr!un) n) ;!n) \*\* r / !re) n)4!r (2ie\*)e)  
- ;\*e(.r -1(. - ;inet(. - ;\*e tr 0. \* )er r -1ing. n) (2ie\*)e) # ne\*(

=%5%7%11 C! / #\*0 ' it2 ANSI4TIA-836 ,!r -!n)uit n) (#\*i-e ;!: (i9ing%

=%5%7%12 ln(t \*\* /!)u\* rB -1( t \*\* !ut\*et( (2! 'nJ !ne ) t B -1 ,!r e -2 ) t  
- ;\*e t e -2 , -e#\* te !r ter / in ti!n #!int% ln(t \*\* )iti!n \* - ;\*e(  
n) /!)u\* rB -1( ( in)i- te) !n t2e )r 'ing(% D! n!t D(#\*it # ir(D  
;et ' een )i,,erent B -1(%

=%5%7%1= Ter / in te - ;\*e( t e -2 B -1 \*- ti!n n) t ter / in ti!n ;! r) !r  
# t-2 # ne% F! \*\*! ' in)u(tr0 gui)e\*ine( n) / nu, -turer(è  
re-! / / en) ti!n( n) #r!-e)ure( ( reCuire)% A\*\* ter / in ti!n  
2 r) ' re (2 \*\* ;e r te) t! e:-ee) t2eir ((!-i te) C teg!r0 r ting ( )  
(#e-i,ie) ;!+e%

=%5%7%2= D! n!t )re(( - ;\*e( in ;un)\*e( \* rger t2 n 25 - ;\*e(% Mu\*ti#\*e 25-- ;\*e  
;un)\*e( / 0 ;e run in # r \*\*e\* ' it2 e+en\*0-(# -e) >e\*-r! - ;\*e tie( in  
n !r)er\*0 (eCuen-e%

=%5%7%25 F!r - ;\*e / n ge /ent !n re r !, # t-2 # ne\*. - ;\*e (2 \*\* ( ' ee# int!  
ter / in ti!n#!int( n ) ;e (u##!rte) ;0 ##r!#ri te re r - ;\*e  
/ n ge /ent%

=%5%7%28 H!ri9!nt \* # t-2 -!r) / n ge /ent i( reCuire) !n \*\* in(t \*\* ti!n(  
'2i-2 )! n!t u(e ng\*e) # t-2 # ne\*(%

=%5%7%23 M int in - ;\*e ;en) r )iu( 5M !uter )i / eter @UT\$ !n\*0A '2en  
/ !unting , -e#\* te !nt! EMT ; -1;!:. ;!:-e\*i / in t!r( !r ,urniture  
1n!-1-!ut(%

=%5%7%27 F -e#\* te( n) SMB( (2 \*\* ;e ,u\*\*0 in(t \*\*e) n) \* ;e\*e) #ri!r t! te(ting%

=%5%7 ABO>E-CEILING 8538( )H%1AB3.23309(I)3.23309( )-574033( ) ? 20175 018nMI--LN



-!r)(,r! / t2e !+er2e ) ? A\$ !ut\*et( t! t2e A\$% C!ntr -t!r (2 \*\* ne t\*0  
-ut 2!\*e( int! t2e -ei'ing ti'e n) ,ini(2 t2e 2!\*e( ' it2 gr! / / et( !r !t2er  
in)u(tr0-(t n) r) ,ini(2ing #ie-e ,!r #r!,e((i!n \*\*!!1%

=%5%6 AUDIO->ISUAL DE>ICES

=%5%6%1 HDBASE-T DE>ICES

=%5%6%1%1 F! \*\*! ' / nu, -turerf( u(erf( / nu \*,!r #r!#er in(t \*\* ti!n%

=%5%6%1%2 One DC 25> #! 'er ) #t!r i( reCuire) n) - n ;e tt -2e) t  
eit2er en) ( t2e !t2er - n ;e energi9e) +i t2e \$!H ,un-ti!n  
!, t2e inter-!nne-ting t'i(te) # ir - ;\*e%

=%5%6%1%= F!r ;e(t #er,!r/ n-e. C teg!r0 3A @i(!\* ti!n 'r # !r (2ie\*)e)A  
t'i(te) # ir - ;\*e (2!u\*) ;e in(t \*\*e) in --!r) n-e 'it2  
##\*i- ;\*e ANS\*4TIA-837 (t n) r)( n) ;e ,ie\*) -erti,ie) t! 800  
MH9 u(ing ##r!+e) te(ter(

=%5%6%1%5 \$r!#er\*0 (e-ure HDMI - ;\*e( t! )e+i-e( ' it2 \*-1 1it ;r -1et(  
n) tie 'r #(%

=%5%6%1%8 ln(t \*\* ti!n / et2!)( (2 \*\* )2ere t! NF\$A N ti!n \* E\*e-tri- \*  
C!)e n) \*\*!\*- \* ;u\*)ing n) ,ire -!)e(

=%5%6%2 STANDARD A> EMTENSION DE>ICES

=%5%6%2%1 F! \*\*! ' / nu, -turerf( in(tru-ti!n (2eet ,!r #r!#er in(t \*\* ti!n  
n) )Bu(t/ent%

=%5%6%2%2 F!r ;e(t #er,!r/ n-e. C teg!r0 r te) t'i(te) # ir - ;\*e (2!u\*)  
;e in(t \*\*e) in --!r) n-e 'it2 ##\*i- ;\*e ANS\*4TIA

=%5%6%=%5 ln(t \*\* ti!n / et2!)( (2 \*\* )2ere t! NF\$A N ti!n \* E\*e-tri- \*  
C!)e n) \*\*!- \* ;u!\*ing n) ,ire -!)e(%

=%5%6%5 HDMI CABLES

=%5%6%5%1 F! \*\*! ' / nu, -turef:( in(tru-ti!n (2eet ,!r #r!#er in(t \*\* ti!n

=%5%6%5%2 Se-ure HDMI - ;\*e( t! -ti+e )e+i-e #!rt( ' it2 - ;\*e \*!-1ing  
1it( !r in)u(tr0 ;e(t #r -ti-e t! / itig te in )+ertent - ;\*e  
)i(-!nne-t(%

=%5%6%8 HDBASET CABLING CHANNELS

=%5%6%8%1 100 #er-ent !, - ;\*ing -2 nne\*( (2 \*\* ;e te(te) t! / eet !r  
e:-ee) ISO4IEC C\* (( EA #er,!r/ n-e # r / eter(%

=%5%6%8%2 C ;\*ing (2 \*\* ;e in(t \*\*e) in --!r) n-e 'it2 / nu, -turef:(  
re-! / / en) ti!n( n) ;e(t in)u(tr0 #r -ti-e( ( ' e\*\* (   
-! / #\*i n-e ' it2 \*\* ##\*i- ;\*e (e-ti!n( !, t2i( S#e-i,i- ti!n  
reg r)ing C teg!r0-r te) (tru-ture) - ;\*ing%

=%5%6%8%= ? 2en - ;\*e( re ;eing in(t \*\*e). (\* -1 @ (er+i-e \*!!#(A (2 \*\* ;e  
#r!+i)e) t ;!t2 en)( t! --! / /!) te ,uture -2 nge( in t2e  
(tru-ture) - ;\*ing (0(te / %

=%5%11%= Gr!un) \*\* (2ie\*)e) # t-2 # ne\*( t! te\*e-! / gr!un) (!ur-e+i # int-  
#ier-ing ' (2er( t! gr!un)e) r -1. !r+i )ire-t gr!un) 'ire t!  
te\*e-! / ;u( ; r%

=%5%12 IDF ROOMS

=%5%12%1 T2e D t n) Te\*-! R!! / ( re tr n(itin#!int ;et' een t2e  
; -1;!ne n) 2!ri9!nt \*)i(tri;uti!n # t2' 0(% T2e r!! / ( (2 \*\* ;e  
;\*e t! -!nt in ) t !r te\*e-! / / uni- ti!n( eCui# / ent. - ;\*e  
ter / in ti!n( n) ((!-i te) -r!((-!nne-ti!n 'iring% C\*(et (# -e(  
re n!t t! ;e (2 re) 'it2 e\*e-tri- \* in(t \*\* ti!n(. !t2er t2 n t2!(e  
)ire-t\*0,!r te\*e-! / / uni- ti!n(. +i)e!. (e-urit0 n) in,!r / ti!n  
(0(te / ( eCui# / ent% T2e r!! / ( re n!t t! ;e (2 re) 'it2 !t2er  
unre\* te) ;ui\*)ing (er+i-e.,!r e: / #\*e #\*u / ;ing% An0 -!n,\*i-t( 'it2  
t2e(e (#e-i,i- ti!n( reCuire t2e ##r!+ \*!, t2e O'nerf( \$r!%e-t  
M n ger%

=%5%12%2 C!ntr -t!r (2 \*\* (u; / it )r 'ing !, t2e IDF r!! / (2! 'ing\* 0!ut !, \*\*

=%5%12%7 A 12 in-2 \* ))er r -1 (0(te / i( reCuire) n) 'i\*\* ;e #r!+i)e) ;0 t2e  
C!ntr -t!r n) in(t \*\*e) in t2e IDF t! #r!+i)e - ;\*e (u##!rt t! t2e r -1  
(0(te / % T2i( in-\*u)e( \*\* !, t2e reCuire) \* ))er r -1 (u##!rt ite / (  
(u-2 ( r -1 t! run' 0 1it( . ' \*\* ng\*e ;r -1et( . -ei'ing (u##!rt(.  
(#i-e( @Bun-ti!n n) ;uttA. r )iu( )r!#( n) B- ;!t(% T2e ,in \* \* ))er  
r -1 \* 0!ut 'i\*\* ;e in-\*u)e) in t2e IDF \* 0!ut r 'ing )e(-ri;e) ;!+e%

=%5%12%6 \$r!+i)e n) in(t \*\* ( nee)e) in t2e IDF r!! / 5 ,t : 7 in-2e( : K in-2  
,ire-r te) #\*0' !!) ;! r) n) \* ;e\*e) 'it2 ,ire r ting (t / # , -ing int!  
t2e r!! / t! --! / /!) te r -1 \* ))er (u##!rt. - ;\*ing (u##!rt.  
gr!un)ing #\* t,!r / . ) t n) +!i-e eCui# / ent% \$ int ; -1 ;! r) '2ite  
@\*e +e (t / # +i(i;\*eAt! / t-2 e:i(ting ; -1 ;! r) in r!! / . i,  
##r!#ri te% L!- ti!n !, in(t \*\* ti!n i(t! ;e)eter / ine) 'it2 ##r!+ \* ;0  
O'ner%

=%5%1= \$ATCH CORDS&

=%5%1=%1 C!ntr -t!r t! #r!+i)e n) in(t \*\* ,i;er n) -!##er # t-2 -!r)( in  
Cu ntitie( )e(-ri;e) ;e' ! '% Ne t\*0 in(t \*\* # t-2 -!r)( in \*engt2( (   
##r!#ri te t! re)u-e unne-e(( r0 \*engt2 in 'ire / n ger(%

=%5%1=%2 In(t \*\* # t-2 -!r)( t t2e eCui# / ent - ;inet ;et' een # t-2 # ne\* n)  
O'ner-#r!+i)e) ('it-2e( ,!r e -2 # t-2 # ne\* n) ' !r1(t ti!n  
\*!- ti!n% \$ t-2 -!r)( (2 \*\* )ire-t--!nne-t ;et' een # t-2 # ne\* n)  
net' !r1ing ('it-2 !r !t2er e\*e-tr!ni-( eCui# / ent% Dre(( n) ;un)\*e  
# t-2 -!r)( ( ##r!#ri te ,!r ,in \* in(t \*\* ti!n% \$r!+i)e n0 unu(e)  
eCui# / ent # t-2 - ;\*e(t! O'ner in !rigin \* # -1 ging u#!n  
-! / #\*eti!n !, #r!Be-t%

=%5%1=% In(t \*\* ?ire\*e(( A--e(( \$!int # t-2 -!r)( ( )e(-ri;e) ;!+e. n)  
-!nne-t C / er ( n) !t2er ,ie\*)-in(t \*\*e) net' !r1 ;\*e)e+i-e+i  
+en)!r-(u##\*ie) # t-2 -!r) t t2e re / !te \*!- ti!n( Return unu(e)  
# t-2 -!r)( t! O'ner in !rigin \* # -1 ging%

=%5%1=%5 \$r!+i)e ' !r1(t ti!n # t-2 -!r)( t! O'ner in !rigin \* # -1 ging%

=%5%1=%8 U(e t2e ,!#! 'ing gui)e\*ine( ,!r #r!Be-t ;i)% >eri,0 \*\* \*engt2( ' it2  
O'ner #r!r t! #ur-2 (e&

=%5%1=%8%1 \$r!+i)e n) in(t \*\* !ne @1A 7-,!!t # t-2 -!r). !, t2e ( / e  
- teg!r0 r ting. ,!r e -2 - ;\*e ter / in te) t t2e # t-2  
# ne\*

=%5%1=%8%2 \$r!+i)e !ne @1A 10-,!!t # t-2 -!r). !, t2e ( / e - teg!r0  
r ting. ,!r e -2 - ;\*e ter / in te) t t2e ter / in \* !ut\*et  
\*!- ti!n

=%5%1=%8%= \$r!+i)e !ne @1A 2- / eter # t-2 -!r). !, t2e ( / e gr )e !,

=%5%1=%3 A\*\* ,i;er # t-2 -!r)( n) reCuire) ' !r1(t ti!n4eCui# / ent # t-2 -!r)(  
n!t in(t \*\*e) (2 \*\* ;e #r!+i)e in 2 n) t! O ' ner( Re#re(ent ti+e #ri!r  
t! #r!be-t -\*(e!ut%

=%5%15 LABELING

=%8%5 Lig2ting \* 0!ut ,i:ture # ttern i( t! #r!+i)e (u,,i-ient \*ig2ting !+er ,r!nt n) ; -1  
!, e -2 eCui# / ent r -1%

=%8%8 In t2e IDF r!! / . / ini / u / !, @2A 20- /#. )e)



=%3%= In-\*u)e \$DF !, ,u\*\* te(t re(u\*(. (u / / r0 in)e: in e\*e-tr!ni- ,!r/ t !n  
CD !r / e / !r0 (ti-1 in t2e OHM # -1 ge u#!n #r!e-t -! / #\*eti!n%

=%3%=5 C ;\*ing (0(te / ( (2 \*\* / eet !r e:-ee) t2e e\*e-tri- \* n) tr n(/ i((i!n  
-2 r -teri(ti-( !, t2e (0(te / ( (#e-i,ie)%

=%3%=8 C ;\*e (eg / ent( n) \*in1( (2 \*\* ;e te(te) ,r! / ;!t2 en)( !, t2e - ;\*e ,!r  
e -2 !, t2e -!n(tru-ti!n #2 (e(% @>eri,0 t2 t - ;\*e \* ;e\*ing / t-2e( t  
; !t2 en) (A%

=%3%=3 T2e (0(te / (2 \*\* n!t ;e -!n(i)ere) -erti,ie) unti\* t2e te(ter 2 (  
-1n! '\*e)ge) t2 t t2e #er,!r / n-e !, t2e #20(i- \*\* 0er !, t2e (0(te /  
2 ( ;een ,u\*0 te(te) n) i( !#er ti!n \* t t2e -! /



=%3%=%12%= Circuit \*D% nu / ;er ' it2 - !rre(#!n)ing B -1 i)entier

=%3%=%12%5 ? ire M # - (2 \*\* in-\*u)e t2e ,!#! 'ing&

=%3%=%12%5%1 C!ntinuit0 t! t2e re / !te en)

=%3%=%12%5%2 S2!rt( ;et 'een n0 t' ! !r / !re -!n)u-t!r(

=%3%=%12%5%= Cr!((e) # ir(

=%3%=%12%5%5 Re+er(e) # ir(

=%3%=%12%5%8 S#\*it # ir(

=%3%=%12%5%3 An0 !t2er / i(- ' iring

=%3%=%12%8 Lengt2

=%3%=%12%3 ln(erti!n L!((

=%3%=%12%7 Ne r-en) Cr!((t \*1 @NEMTA L!((

=%3%=%12%7 \$S-NEMT @\$! 'er Su / Ne r En) Cr!(( T \*1A

=%3%=%12%6 FEMT @F r En) Cr!((t \*1A

=%3%=%12%10 ELFEMT @ECu \* Le+e\* F r En) Cr!(( T \*1A

=%3%=%12%11 \$S-ELFEMT @\$! 'er Su / ECu \* Le+e\* F r En) Cr!(( T \*1A

=%3%=%12%12 \$r!# g ti!n De\* 0

=%3%=%12%1= De\* 0 S1e '

=%3%=%12%15 Return \*!((

=%3%=%12%18 \$SFEMT @\$! 'er Su / F r En) Cr!((t \*1A

=%3%=%12%13 \$SACRF @\$! 'er Su / Attenu ti!n t! Cr!((t \*1 R ti!. F r En)A

=%3%=%1= Te(t Re(u\*( ,!r CAT3A (2 \*\* in-\*u)e \*\* !, t2e ;!+e. #\*u( t2e ,!#! 'ing&

=%3%=%1=%1 AACRF @A\*ien Attenu ti!n t! Cr!((t \*1 R ti!. F r En)A

=%3%=%1=%2 AFEMT @ En)AF007(1)0.590251(2)0.590251(%) -5.15007(1)0.590251(0)110

# TELECOMMUNICATIONS CABLING SYSTEM

STRUCTURED CABLING FOR VOICE AND DATA -  
INSIDE PLANT  
SECTION 27 10 05-1

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STRUCTURED CABLING FOR VOICE AND DATA -  
INSIDE PLANT  
SECTION 27 10 05-4

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1'4'22 USDA RUS 455-;4 - G#+ Tu-e Su "e A e+t\$ + /PE-;00A US De&# t \* ent \$6  
A" !)u(tu e

1'5 SUBMITTALS

1'5'1 See Se)t!\$n 01 40 00 - A. \* !n!+t #t!,e Re8u! e \* ent+7 6\$ +u- \* !tt#( & \$)e.u e+'

1'5'2 P \$.u)t D##=- M#nu6#)tu e [+ .#t# +1eet+ \$n e#)1 & \$.u)t t\$ -e u+e.7 !n)(u.ln"=

1'5'2'1 In+t#((#t!\$n \* et1\$.+'

1'5'4 S1\$& D #2!n" += S1\$2 )\$ \* &(!#n)e 2!t1 e8u! e \* ent+ \$n !+\$ \* et !) +)1e \* #t!)  
.!# " # \* \$6 net2\$ @ (#3\$ut7 +1\$2!n" )#-(e \$ut!n"+7 te(e)\$ \* \* un!)#t!\$n )(\$+et+7  
#)@ #n. en)(\$+u e (#3\$ut+ #n. (\$)#!t!\$n+7 +e ,!)e ent #n)e7 #n. " \$un.ln"7  
& e&# e. #n. #&& \$,e. -3 BICSI Re"!+te e. C\$ \* \* un!)#!t!\$n+ D!+t !-ut!\$n  
De+!"ne /RCDD0'

1'5'5 M#nu6#)tu e 9u#(!6!)#!t!\$n+'

1'5'5 In+t#((e 9u#(!6!)#!t!\$n+'

STRUCTURED CABLING FOR VOICE AND DATA -  
INSIDE PLANT  
SECTION 27 10 05-5

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STRUCTURED CABLING FOR VOICE AND DATA -  
INSIDE PLANT  
SECTION 27 10 05-5

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2'2'1'2 P \$, !. e 6!>e. )#-(e+ #n. &#t12#3+ t1#t )\$ \* &(3 2!t1 NFPA 70 #n.  
ANS(CD-STD- <07 #n. # e UL (!+te. \$ t1! . &# t3 !n. e&en. ent te+t!n"  
(#-\$ #t\$ 3 )e t!6!e.'

2'2'1'4 P \$, !. e )\$nne)t!\$n...e,!e+ t1#t # e #te. 6\$ \$&e #t!\$n un.e )\$n. !t!\$n+  
\$6 42 t\$ 150 .e" ee+ F #t e(#t!,e 1u \* !. !t3 \$6 0 t\$ : -5. 15007(7(7(104u. 439 0 T dB [ (. )07( )-

STRUCTURED CABLING FOR VOICE AND DATA -  
INSIDE PLANT  
SECTION 27 10 05-<

2'4 PATH ? AYS

2'4'1 C\$ n. ult= A+ +&e)!e. In Se)t!\$n 2< 05 45A & \$,!.e &u(( )\$ . + ln #(( )\$ n. ult'

2'4'2 Un.e " \$un. Se ,!)e Ent #n)e= PVC7 T3&e EPC-50 )\$ n. ult'

2'5 COPPER CABLE AND TERMINATIONS

2'5'1 C\$&&e B#)@-\$ne C#-(e= TIAEIA-5<; C#te"\$ 3 < +\$(!. )\$ n. u)t\$ un+1!e(.e. t2!+te. &#! /UTP07 25 A ? G7 100 \$1 \* A 100 &#! + 6\$ \* e. Int\$ 25-&#! -ln.e " \$u&+A )\$,e e. 2!t1 " #3 t1e \* \$&(#+t!) f#)@et #n. )\$ \* &(3!n" 2!t1 #(( e(e,#nt &# t+ \$6 #n. #. .en.# t\$ (#te+t e.!t!\$n+ \$6 TIAEIA-5<; #n. ICEA S-:0-<<17 #n. UL 555'

2'5'1'1 In (\$)#!t!\$n+ \$t1e t1#n ln &(enu \* +7 & \$,!.e NFPA 70 t3&e CMR !+e - #te. \$ t3&e CMP &(enu \* - #te. )#-(e'

2'5'1'2 In &(enu \* +7 & \$,!.e NFPA 70 t3&e CMP &(enu \* - #te. )#-(e'

2'5'1'4 P \$,!.e )#-(e 1#,ln" )\$ n. u)t\$ + t2!+te. #t \* !n! \* u \* #te \$6 t2\$ &e 6\$\$tA #)tu#( (en"t1 #n. 6 e8uen)3 \$6 t2!+t+ #t \* #nu6#)tu e [+ \$&t!\$n'

2'5'1'5 C\$( \$ )\$.e )\$ n. u)t\$ + ln #))\$ .#n)e 2!t1 ICEA S-:0-<<1'

2'5'1'5 Te+t!n"= Fu n!+1 6#)t\$ 3 ee( te+t+'

2'5'2 C\$&&e H\$ !G\$nt#( C#-(e= TIAEIA-5<; C#te"\$ 3 < +\$(!. )\$ n. u)t\$ un+1!e(.e. t2!+te. &#! /UTP07 25 A ? G7 100 \$1 \* A 5 ln.!,!.u#((3 t2!+te. &#! +A )\$,e e. 2!t1 -(ue f#)@et #n. )\$ \* &(3!n" 2!t1 #(( e(e,#nt &# t+ \$6 #n. #. .en.# t\$ (#te+t e.!t!\$n \$6 TIAEIA-5<; #n. UL 555'

2'5'2'1 In (\$)#!t!\$n+ \$t1e t1#n ln &(enu \* +7 & \$,!.e NFPA 70 t3&e CMG "ene #( &u &\$+e7 CMR !+e - #te.7 \$ t3&e CMP &(enu \* - #te. )#-(e'

2'5'2'2 In &(enu \* +7 & \$,!.e NFPA 70 t3&e CMP &(enu \* - #te. )#-(e'

2'5'2'4 Te+t!n"= Fu n!+1 6#)t\$ 3 ee( te+t+'

2'5'4 C\$&&e C#-(e Te \* !n#!t!\$n+= ln+u#!t!\$n .!+&(#)e \* ent )\$ nne)t!\$n /IDC0 t3&e u+ln" #&& \$& !#te t\$(A u+e +) e2n'





STRUCTURED CABLING FOR VOICE AND DATA -  
INSIDE PLANT  
SECTION 27 10 05-;

2'<'2'4 L#-e(+ F#)t\$ 3 !n+t#(e. (# \* !n#te. &(#+t!) n# \* e&(#te+ #- \$, e e#)1 &\$ t7  
nu \* -e e. )\$n+e)ut!,e(3A )\$ \* &(3 2!t1 TIAEIA-<0< u+!n" en)\$ . e.  
!.ent!6!e +'

2'<'2'5 P \$,!.e !n)\$ \* !n" )#-(e +t #!n e(!e6 #n. \$ut!n" "u!.e+ \$n -#)@ \$6 &#ne('

2'<'2'5 P#t)1 C\$ .+= P \$,!.e \$ne /10 &#t)1 )\$ . 6\$ e#)1 &#! \$6 &#t)1 &#ne(  
&\$ t+'

2'<'4 P#t)1 P#ne(+ 6\$ F!-e O&t!) C#-(!n"= S!Ge. t\$ 6!t EIA +t#n.# . 1: !n)1 2!.e  
e8u!& \* ent #)@+A 0'0: !n)1 t1!)@ #(!u \* !nu \* '

2'<'4'1 A.#&t\$ += A+ +&e)!6!e. #- \$, e un.e FIBER OPTIC CABLINGA  
\* #>! \* u \* \$6 25 .u&(e> #.#&t\$ + &e +t#n.# . &#ne( 2!.t1'

2'<'4'2 L#-e(+ F#)t\$ 3 !n+t#(e. (# \* !n#te. &(#+t!) n# \* e&(#te+ #- \$, e e#)1 &\$ t7  
nu \* -e e. )\$n+e)ut!,e(3A )\$ \* &(3 2!t1 TIAEIA-<0< u+!n" en)\$ . e.  
!.ent!6!e +'

2'<'4'4 P \$,!.e !n)\$ \* !n" )#-(e +t #!n e(!e6 #n. \$ut!n" "u!.e+ \$n -#)@ \$6 &#ne('

2'<'4'5 P \$,!.e e# )#-(e \* #n#"e \* ent t #3 #t (e#+t ; !n)1e+ .ee& 2!t1  
e \* \$,#-(e )\$,e '

2'<'4'5 P \$,!.e .u+t )\$,e + 6\$ unu+e. #.#&t\$ +'

2'<'4'< P#t)1 C\$ .+= P \$,!.e \$ne /10 &#t)1 )\$ . 6\$ e#)1 &#! \$6 &#t)1 &#ne(  
&\$ t+'

2'7 ENCLOSURES

2'7'1 B#)@-\$# .+= Inte !\$ " #.e &(32\$\$ . 2!t1\$ut , \$!.+7 405 !n)1 t1!)@A UL-#-e(e.  
6! e- et# .#nt'

2'7'1'1 S!Ge= A+ !n.!)#te. \$n . #2!n"+'

2'7'1'2 D\$ n\$t &#!nt \$,e UL (#-e('

2'7'2 E8u!& \* ent R#)@+ #n. C#-!net+= 7 6t DAMAC CEA-410 +t#n.# . 1: !n)1 2!.e  
)\$ \* &\$nent #)@+'

2'7'2'1 F(\$\$ M\$unte. R#)@+= 1< "#e +tee( )\$n+u)t!\$n 2!t1 )\$ \$+!\$n  
e+!+t#nt 6!n!+1A ,e t!)#( #n. 1\$ !G\$nt#( )#-(e \* #n#"e \* ent )1#nne(+7 t&&  
#n. -\$t\$ \* )#-(e t \$u1 1+7 #n. " \$un.!n" (u"'

STRUCTURED CABLING FOR VOICE AND DATA -  
INSIDE PLANT  
SECTION 27 10 05-:

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2'7'4'1 C###!t3- One & \$te)t\$ \* \$.u(e &e &#! !n !n)\$ \* !n" )#-(e'

2'7'4'2 P \$te)t\$ M\$.u(e+= T3&e #te. 6\$ t1e ##&(!)#t!\$n'

STRUCTURED CABLING FOR VOICE AND DATA -  
INSIDE PLANT

STRUCTURED CABLING FOR VOICE AND DATA -  
INSIDE PLANT  
SECTION 27 10 05-11

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STRUCTURED CABLING FOR VOICE AND DATA -  
INSIDE PLANT  
SECTION 27 10 05-12

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4'4'4 C\$&&e C#-(!n"=-

4'4'4'1 C#te"\$ 3 5e0<= M#!nt#!n )#-(e "e\$ \* et 3A . \$ n\$t unt2!+t \* \$ e t1#n 102  
!n)1 6 \$ \* &\$!nt \$6 te \* !n#!\$n'

4'4'4'2 F\$ 5-&#! )#-(e+ !n )\$n . ult7 . \$ n\$t e>)ee . 25 &\$un . + &u(( ten+!\$n'

4'4'4'4 C\$&&e C#-(!n" N\$t !n C\$n . ult= U+e \$n(3 t3&e CMP &(enu \* - #te . )#-(e  
#+ +&e)!6!e . '

4'4'5 F!-e O&t!) C#-(!n"=-

4'4'5'1 P e&# e 6\$ &u(!n" -3 )utt!n" \$ute f#)@et 6\$ 10 !n)1e+ 6 \$ \* en .7 (e# , !n"  
+t en"t1 \* e \* -e + e>&\$+e . ' T2!+t +t en"t1 \* e \* -e + t\$"et1e #n .  
#tt#)1 t\$ &u(!n" e3e'

4'4'5'2 Su&&\$ t , e t!)#( )#-(e #t !nte , #(+ #+ e)\$ \* \* en . e . -3 \* #nu6#)tu e

4'4'5'4 F ee-#! 2!((-e #n !n !nne . u)t 1 M !n)1'

4'4'5 F(\$\$ -M\$unte . R#)@+ #n . En)(\$+u e+= Pe \* #nent(3 #n)1\$ t\$ 6(\$\$ !n

## STRUCTURED CABLING FOR VOICE AND DATA -

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! " #



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1 3 . ( # ) ( 0 \* % , - - ( 0 , + \* \* 2 ) ) 0 \*  
\* , - ( ( 0 - \* %

% % @ / , / - 0 + / , ? , - ( 0 0 + # 9 )  
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Or"n!e -#r 82'59125-1 /r#1 eter /"4+e'

2'5'5'2 C"4+e /#r\*" !e E"/<et0 - 4er0 un t0 "n\* !r#u% /##r ). "4e " /#r\* n! t#  
TIA9EIA- 5>:-B'

2'5'5'5 I1 %r nte\* ( t. - 4er /#unt0 - 4er t2%e0 "n\* "!!re!"te +en!t. "t re!u+r  
nter, "+) n#t t# e6/ee\* 70 n/.e) @1000 1 1A'

2'8 O&TICAL FIBER CABLE HARDDARE

2'8'1 M"nu-"/turer)3 Su4ie/t t# /#1 %t "n/e ( t. re?u re1 ent)0 %r#, \*e %r#\*u/t) 42  
#ne #- t.e -##( n!3

2'8'1'1 Ortr#n /)

2'8'2 Cr#)-C#nne/t) "n\* &"t/. &"ne)3 M#\*u+r %"ne+) .#u) n! 1 ut %e-nu 14ere\*0  
\*u%e6 /"4+e /#nne/t#r)'

2'8'5 C##r\* n"te )u4%"r" !r"% . 4e+##( ( t. Dr" ( n!) -#r ?u"nt t2 #- /#nne/t#r)'

2'8'5'1 Nu 1 4er #- C#nne/t#r) %er F e+\*3 JOneK LIn)ert nu 1 4erM -#r e" / . - 4er #-  
/"4+e #r /"4+e " ) ) !ne\* t# - e+\*0 %u) )%"re) "n\* 4+"n< %#) t #n)  
"\*e?u"te t# )ut )%e/ - e\* e6%"n) #n /r ter "'

2'8'7 &"t/. C#r\*)3 F"/t#r2-1 " \*e0 \*u"t-- 4er /"4+e) n 58- n/. @>00-1 1A +en!t.)'

2'8'5 C"4+e C#nne/t n! H"r\* ( "re3

2'8'5'1 C#1 %t2 ( t. O%t /"+ F 4er C#nne/t#r +nter 1 "te "4+t2 St"n\* "r\*)  
@FOCISA )%e/ - /"t #n) #- TIA9EIA-807-20 TIA9EIA-807-5-A0 "n\* TIA9EIA-  
807-12' C#1 %t2 ( t. TIA9EIA-58:-B'5'

2'8'5'2 Bu /<-/#nne/t0 ) 1 %e6 "n\* \*u%e60 T2%e LC /#nne/t#r) In)ert #n #))  
n#t 1 #re t. "n 0'75 \*B'

2'7 COAQUAL CABLE

2'7'1 M"nu-" /turer)3 Su4fe/t t# /#1%+ "n/e ( t. re?u re1 ent)0 %r#, \*e %r#\*u/t) 42  
#ne #- t.e -#++# ( n!3

2'7'1'1 A+% . " D re C#1%" n2'

2'7'1'2 Be+\*en CDT In/'N E:e/tr#n /) D , ) #n'

2'7'1'5 C#1 1 S/#%e0 In/'

2'7'2 C"4+e C. "r" /ter )t /)3 Br#" \*4"n\* t2%e0 re/#1 1 en\*e\* 42 /"4+e 1 "nu-" /turer  
)%e/ - /"+2 -#r 4r#" \*4"n\* \* "t" tr"n) 1 )) #n "%%+ /"t #n)' C#"6 "+ /"4+e "n\*  
"//e))#r e) ). "+ . " ,e 75-#. 1 n#1 n"+ 1%e\*"n/e ( t. " return #)) #- 20 \*B  
1 "6 1 u1 -r#1 7 t# :08 MH='





2'>'2'2'2 One -#r e" / . -#ur-% " r /#n\*u/t#r !r#u% #- n\* / "te\* / "4+e)0 %u)  
25 %er/ent )%"re %#) t #n)'

2'>'2'5 M#unt n!3 Re/e))e\* n /e+n!0 D "#'

2'>'2'7 NRTL+)te\* ") /#1%+2 n! ( t. UL 50 "n\* UL 1:85'

2'>'2'5 D.en n)t"#e\* n %+enu1) u)e\* -#r en, r#n 1 ent"+ " r0 NRTL+)te\* ") /#1%+2 n!  
( 0236 (#)0.59025 1 (n) 1 1 .4807 ( 1 ) ] T J 256.09 0 T d [ (e)0.59025 1 (n)0.59025 1 (t)5.7657025t85

2'11 TELECOMMUNICATIONS OUTLET/CONNECTORS

2'11'1 C"/<) 100-#. 10 4"+n/e\*0 t( )te\*-%" r /#nne/t#r\ -#ur-%" r0 e !.t-%#) t #n  
1 #\*u+r' C#1%+2 ( t. TIA/EIA-58:-B'1'

2'11'2 D#r<)t"t #n Out:et) 3 F#ur-%#rt-/#nne/t#r ")e14+e) 1#unte\* n J1ut !"n!  
-"/e%+"te'

2'11'2'1 Met"+ F"/e%+"te 3 St" n:e)) )tee+0 /#1%+2 n! ( t. re?ure1ent) n  
D , ) #n 28 Se/t #n ;D rn! De, /e)';



## COMMUNICATIONS HORIZONTAL CABLING





5'7'8 Out\*##r C#"6 "+ C"4+e ln)t"++t #n3

5'7'8'1 ln)t"++ #ut\*##r /#nne/t #n) n en/+#)ure) /#1%+2 n! ( t. NEMA 2500  
T2%e 7Q' ln)t"++ /#rr#) #n-re) )t"nt /#nne/t#r) ( t. %r#%er+2 \*e) !ne\* 0-  
rn!) t# <ee% #ut 1 # )ture'

5'7'8'2 Att"/. "ntenn" +e"\*- n /"4+e t# )u%#rt )tru/ture "t nter, "+) n#t  
e6/ee\* n! 58 n/.e) @>15 1 1A'

5'7'7 Gr#u% /#nne/t n! . "r\* ("re -#r /"4+e) nt# )e%"r"te #! /"+-e+\*)'

5'7': Se%"r"t #n -r#1 EMI S#ur/e)3

5'7': '1 C#1%+2 ( t. BICSI TDMM "n\* TIA9EIA-58>-A -#r) e%"r"t n! un) . e+\*e\*  
/#%#er ,# /e "n\* \* "t" /#1 1 un /"t #n /"4+e -r#1 %#tent "+ EMI )#ur/e)0  
n/+u\* n! e+e/tr /"+ %#(er +ne) "n\* e?u%1 ent'

5'7': '2 Se%"r"t #n 4et (een #%en /#1 1 un /"t #n) /"4+e) #r /"4+e) n  
n#n1 et"++ /r"/e ("2) "n\* un) . e+\*e\* %#(er /#n\*u/t#r) "n\* e+e/tr /"+  
e?u%1 ent ) . "++ 4e " ) -### ( )3

5'7': '2'1 E+e/tr /"+ E?u%1 ent R"t n! Le)) T. "n 2 <FA3 A 1 n 1 u1 #- 5  
n/.e) @127 1 1A'

5'7': '2'2 E+e/tr /"+ E?u%1 ent R"t n! 4et (een 2 "n\* 5 <FA3 A 1 n 1 u1  
#- 12 n/.e) @500 1 1A'

5'7': '2'5 E+e/tr /"+ E?u%1 ent R"t n! M#re T. "n 5 <FA3 A 1 n 1 u1 #-  
27 n/.e) @810 1 1A'

5'7': '5 Se%"r"t #n 4et (een /#1 1 un /"t #n) /"4+e) n !r#un\*e\* 1 et"++ /  
r"/e ("2) "n\* un) . e+\*e\* %#(er +ne) #r e+e/tr /"+ e?u%1 ent ) . "++ 4e " )  
-### ( )3

5'7': '5'1 E+e/tr /"+ E?u%1 ent R"t n! Le)) T. "n 2 <FA3 A 1 n 1 u1 #-  
2-192 n/.e) @87 1 1A'

5'7': '5'2 E+e/tr /"+ E?u%1 ent R"t n! 4et (een 2 "n\* 5 <FA3 A 1 n 1 u1  
#- 8 n/.e) @150 1 1A'

5'7': '5'5 E+e/tr /"+ E?u%1 ent R"t n! M#re T. "n 5 <FA3 A 1 n 1 u1 #-  
12 n/.e) @500 1 1A'

5'7': '7 Se%"r"t #n 4et (een /#1 1 un /"t #n) /"4+e) n !r#un\*e\* 1 et"++ /  
r"/e ("2) "n\* %#(er +ne) "n\* e+e/tr /"+ e?u%1 ent +#/"te\* n !r#un\*e\*  
1 et"++ / /#n\*u t) #r en/+#)ure) ) . "++ 4e " ) -### ( )3

5'7': '7'1 E+e/tr /"+ E?u%1 ent R"t n! Le)) T. "n 2 <FA3 N# re?u re 1 ent'

5'7': '7'2 E+e/tr / "+ E?u%1 ent R"t n! 4et ( een 2 "n\* 5 <FA3 A 1 n 1u1  
#- 5 n/ .e) @78 1 1A'

5'7': '7'5 E+e/tr / "+ E?u%1 ent R"t n! M#re T. "n 5 <FA3 A 1 n 1u1 #-  
8 n/ .e) @150 1 1A'

5'7': '5 Se%"r"t #n 4et ( een C# 1 1 un / "t #n) C"4+e) "n\* E+e/tr / "+ M##tr) "n\*  
Tr"n)-#r 1er) 5 <FA #r H& "n\* L"r!er3 A 1 n 1u1 #- 7: n/ .e) @1200  
1 1A'

5'7': '8 Se%"r"t #n 4et ( een C# 1 1 un / "t #n) C"4+e) "n\* F+u#re)/ent F 6ture)3  
A 1 n 1u1 #- 5 n/ .e) @127 1 1A'

#### 5'5 FIRESTO&&ING

5'5'1 C# 1 %2 ( t. re?u re 1 ent) n D , ) #n 07 Se/t #n ;&enetr"t #n F re)t#% n!';

5'5'2 C# 1 %2 ( t. TIA9EIA-58>-A0 Anne6 A0 ;F re)t#% n!';

5'5'5 C# 1 %2 ( t. BICSI TDMM0 ;F re)t#% n! S2)te 1 ); Art /+e'

#### 5'8 GROUNDING

5'8'1 In)t"+ !r#un\* n! " // #r\* n! t# BICSI TDMM0 HGr#un\* n! 0 B#n\* n! 0 "n\* E+e/tr / "+  
&r#te/t #n; C. "%ter'

5'8'2 C# 1 %2 ( t. ANS+C-STD-807-A'

5'8'5 L#/"te !r#un\* n! 4u) 4"r t# 1 n 1 =e t. e +en!t. #- 4#n\* n! /#n\*u/t#r)' F")ten



5'7'5 C#1%+2 ( t. re?u re1 ent) n D , ) #n 0> Se/t #n ;Inter #r &" nt n!; -#r %" nt n!  
4"/<4#"r\*)' F#r - re-re) )t"nt %2(##\*0 \*# n#t %" nt #,er 1 "nu-"/turer;) +4e'

5'7'7 &" nt "n\* +"4e+ /#r) -#r e?u %1 ent \*ent - /"t #n ). "+ /#1%+2 ( t. TIA9EIA-  
808-A -#r JC+) ) 2K JC+) ) 5K JC+) ) 7K +e, e+ #- " \* 1 n )tr"t #n J0 n/+u\* n! #%t #n+  
\*ent - /"t #n re?u re1 ent) #- t. ) )t"n\* "r\*K'

5'7'5 C"4+e S/ .e\*u+e3 &#)t n %r#1 nent #/"t #n n e"/. e?u %1 ent r##1 "n\* ( r n!  
/+#)et' L)t n/#1 n! "n\* #ut!#n! /"4+e) "n\* t.er \*e) !n"t #n)0 #r ! n)0 "n\*  
\*e)t n"t #n)' &r#te/t ( t. r! \* -r" 1e "n\* /+e"r %+)t / /#,er' Furn ). "n  
e+e/tr#n / /#%2 #- -n+ /#1%re.en) ,e )/ .e\*u+e) -#r &r#e/t'

5'7'8 C"4+n! A\* 1 n )tr"t #n Dr" ( n!)3 S.#( 4u+\* n! -##r %+"n) ( t. /"4+n!  
" \* 1 n )tr"t #n-%# nt +"4e+n! 'l\*ent -2+"4e+n! /#n,ent #n "n\* ).#( +"4e+) -#r  
te+e/#1 1 un /"t #n) /#)et)0 J4"/<4#ne %"t. ( "2) "n\* /"4+e)0K Jentr"n/e  
%"t. ( "2) "n\* /"4+e)0K ter1 n+ . "r\* ( "re "n\* %#) t #n)0 .#r =#nt+ /"4+e)0 ( #r<  
"re" ) "n\* ( #r<)t"t #n ter1 n+ %#) t #n)0 !r#un\* n! 4u)e) "n\* %"t. ( "2)0 "n\*  
e?u %1 ent !r#un\* n! /#n\*u/t#r)' F##( /#n,ent #n #- TIA9EIA-808-A' Furn ).  
e+e/tr#n / re/#r\* #- "u \*r" ( n!)0 n )#t( "re "n\* -#r 1 "t )e+e/te\* 42 O(ner'

5'7'7 C"4+e "n\* D re l\*ent - /"t #n3

5'7'7'1 L"4e+ e"/. /"4+e ( t. n 7 n/ .e) @100 1 1A #- e"/. ter1 n"t #n "n\* t" %0  
( .ere t ) "/e) 4+e n " /"4 net #r fun/t #n #r #ut+et 4#60 "n\*  
e+)e ( .ere " ) n\* /"te\*'

5'7'7'2 E"/. ( re /#nne/te\* t# 4u+\* n! -1#unte\* \*e, /e ) n#t re?u re\* t# 4e  
nu14ere\* "t \*e, /e - /#r#r #- ( re ) /#n) )tent ( t. ")#/ "te\* ( re  
/ #nne/te\* "n\* nu14ere\* ( t. n %"ne+ #r /"4 net'

5'7'7'5 E6%#)e\* C"4+e) "n\* C"4+e) n C"4+e Tr"2) "n\* D re Tr#u! . )3 L"4e+  
e"/. /"4+e "t nter, +) n#t e6/ee\* n! 15 -eet @7'5 1A'

5'7'7'7 L"4e+ e"/. ter1 n"t )tr% "n\* )/re ( ter1 n"t n e"/. /"4 net0 r"/<0 #r  
%"net'

5'7'7'7'1 ln\* , \*u"+2 nu14er ( r n! /#n\*u/t#r) /#nne/te\* t# ter1 n"+  
)tr%)0 "n\* \*ent -2 e"/. /"4+e #r ( r n! !r#u% 4e n! e6ten\*e\*  
-r#1 " %"ne+ #r /"4 net t# " 4u+\* n! -1#unte\* \*e, /e ). "+ 4e  
\*ent -e\* ( t. n" 1e "n\* nu14er #- %"rt /u+ "r \*e, /e " ) ).#(n'

5'7'7'7'2 L"4e+ e"/. unt "n\* -e\* ( t. n \* )tr 4ut #n r"/<) "n\* -r" 1e)'

5'7'7'5 l\*ent - /"t #n ( t. n C#nne/t#r F e+\*) n E?u %1 ent R##1) "n\* D r n!  
C+#)et)3 L"4e+ e"/. /#nne/t#r "n\* e"/. \* )/rete unt #- /"4+e-  
ter1 n"t n! "n\* /#nne/t n! . "r\* ( "re' D .ere ) 1 + "r i"/<) "n\* %u!) "re  
u)e\* -#r 4#t. ,# /e "n\* \*t" /#1 1 un /"t #n /"4+n!0 u)e " \* --erent  
/##r -#r i"/<) "n\* %u!) #- e"/. )er, /e'

5'7'7'8 Un ?ue:2 \*ent-2 "n\* + "4e+ (#r< "re" / "4+e) e6ten\* n! -r#1 t.e MUTOA  
t# t.e (#r< "re" T.e) e / "4+e) 1 "2 n#t e6/ee\* t.e +en!t. )t"te\* #n t.e  
MUTOA + "4e+'

5'7': L"4e+) ). "+ 4e %re%r nte\* #r / #1 %uter-%r nte\* t2%e ( t. %r nt n! "re" "n\* -#nt  
/#+ #r t. "t / #ntr")t) ( t. / "4+e E" / <et / #+ #r 4ut )t+ / #1 %t e) ( t. re?u re1 ent) n  
TIA9EIA- 808-A'

5'7': '1 C"4+e) u)e +e6 4+e , n2+ #r %#+2e)ter t. "t +e6 " ) / "4+e) "re 4ent'

5': FIELD BUALITY CONTROL'

5': '1 Te)t n! A!en/23 En!"!e " ?u"+- e\* te)t n! "!en/2 t# %er-#r1 te)t) "n\*  
n)%e/t #n)'

5': '2 Te)t) "n\* ln)%e/t #n)3

5': '2'1 F )u"+2 n)%e/t UT& "n\* #%/t / "+- 4er / "4+e E" / <et 1 "ter "+) -#r NRTL  
/ert - / "t #n 1 "r<n!)' ln)%e/t / "4+ n! ter1 n"t #n) n / #1 1 un / "t #n)  
e?u %1 ent r##1) -#r / #1 %t "n/e ( t. / #+ #r- / #\* n! -#r % n " ) ) !n1 ent)0  
"n\* n)%e/t / "4+ n! / #nne/t #n) -#r / #1 %t "n/e ( t. TIA9EIA-58:-B'1'

5': '2'2 F )u"+2 / #n- r1 C"te! #r2 80 1 "r<n! #- #ut+et)0 / #, er %t"te)0  
#ut+et9 / #nne/t #r)0 "n\* % "t/ . % "ne+)'

5': '2'5 F )u"+2 n)%e/t / "4+e %t" / e1 ent0 / "4+e ter1 n"t #n0 !r#un\* n! "n\*  
4#n\* n!0 e?u %1 ent "n\* % "t/ . / #r\*)0 "n\* + "4e+n! #- "+ / #1 % #nent)'

5': '2'7 Te)t UT& 4" / <4#ne / #%%er / "4+ n! -#r DC +##% re) )t"n/e0 ) . #rt)0  
##en)0 nter1 ttent -"ut)0 "n\* %#+ "r2 4et ( een / #n\* u/t #r)' Te)t  
##er"t #n #- ) . #rt n! 4"r) n / #nne/t #n 4+ / <)' Te)t / "4+e) "-ter  
ter1 n"t #n 4ut n#t / r#) ) - / #nne/t #n'

5': '2'7'1 Te)t n)tru1 ent) ). "+ 1 eet #r e6/ee\* "%%t / "4+e re?u re1 ent)  
n TIA9EIA- 58:-B'2' &er-#r1 te)t) ( t. " te)ter t. "t / #1 %t e)  
( t. %er-#r1 "n/e re?u re1 ent) n ;Te)t ln)tru1 ent)  
@N#r1 "t , eA; Anne60 / #1 %t2 n! ( t. 1 e" )ure1 ent " / ur" / 2  
)%e/ - e\* n ;Me" )ure1 ent A / ur" / 2 @ln-#r1 "t , eA; Anne6' U)e  
#n+2 te)t / #r\*) "n\* "\*" %ter) t. "t "re ?u"+- e\* 42 te)t  
e?u %1 ent 1 "nu-" / turer -#r / . "nne+ #r +n< te)t / #n- !ur"t #n'

5': '2'5 O%t / "+ F 4er C"4+e Te)t)3

5': '2'5'1 Te)t n)tru1 ent) ). "+ 1 eet #r e6/ee\* "%%t / "4+e re?u re1 ent)  
n TIA9EIA- 58:-B'1' U)e #n+2 te)t / #r\*) "n\* "\*" %ter) t. "t "re  
?u"+- e\* 42 te)t e?u %1 ent 1 "nu-" / turer -#r / . "nne+ #r +n<  
te)t / #n- !ur"t #n'

5': '2'5'2 L n< En\* -t#-En\* Attenu"t #n Te)t)3

5': '2'5'2'1 H#r =#nt"+ "n\* 1 u+t 1 #\*e 4"/<4#ne +n<  
1 e")ure 1 ent)3 Te)t "t :50 #r 1500 n1 n 1 \* re/t #n  
"//#r\* n! t# TIA9EIA-528-17-A0 Met.\* #\* B0 One  
Re-eren/e Cu 1 %er'

5': '2'5'2'2 Attenu"t #n te)t re)u)t) -#r 4"/<4#ne +n< ) . "# 4e  
+e)) t. "n 2'0 \*B' Attenu"t #n te)t re)u)t) ) . "# 4e +e))  
t. "n t. "t /"+/u+"te\* " // #r\* n! t# e?u"t #n n TIA9EIA-  
58:-B'1'

5': '2'8 UT& &er-#r 1 "n/e Te)t)3

5': '2'8'1 Te)t -#r e"/. #ut+et "n\* MUTOA' &er-#r 1 t.e -##( n! te)t)  
"//#r\* n! t# TIA9EIA-58:-: '1 "n\* TIA9EIA-58:-: '23

5': '2'8'1'1 D re 1 "%'

5': '2'8'1'2 Len!t. @%.2) /"+ ,)' e+e/tr /"+0 "n\* +en!t.  
re?u re 1 ent)A'

5': '2'8'1'5 ln)ert #n #))'

5': '2'8'1'7 Ne"r-en\* /r#))t"< @NEQTA #))'

5': '2'8'1'5 &#(er)u 1 ne"r-en\* /r#))t"< @SNEQTA #))'

5': '2'8'1'8 E?u"++e,e+ -"r-en\* /r#))t"< @ELFEQTA'

5': '2'8'1'7 &#(er)u 1 e?u"++e,e+ -"r-en\* /r#))t"<  
@SELFEQTA'

5': '2'8'1': Return #))'

5': '2'8'1'> &r#%"! "t #n \*e"2'

5': '2'8'1'10 De+"2 )<e ('

5': '2'7 O%t /"+ F 4er C" 4+e &er-#r 1 "n/e Te)t)3 &er-#r 1 #%t /"+ -4er en\* -t#-en\*  
+n< te)t) " // #r\* n! t# TIA9EIA-58:-: '1 "n\* TIA9EIA-58:-: '5'

5': '2': Ret" n - r)t )u4%"r"!r"% . 4e+# ( (.en /"4+e ) u)e\* -#r 4r#" \*4"n\*  
/#)e\* -/ r/ut te:e, ) #n "%%+ /"t #n)' Re, )e t# )ut te)t) t# ,er -2 /"4+e  
%er-#r 1 "n/e -#r #t.er )2)te 1 ) u) n! /#"6 "+ /"4+e'

5': '2'> C#"6 "+ C"4+e Te)t)3 C#n\*u/t te)t) " // #r\* n! t# D , ) #n 27 Se/t #n  
;M")ter Antenn" Te+e, ) #n S2)te 1';

5':'2'10 F n"+ Fer - /"t #n Te)t)3 &er-#r1 ,er - /"t #n te)t) -#r UT& "n\* #t /"+  
- 4er )2)te1) "-ter t.e /#1%+ete /#1 1 un /"t #n) /"4+n! "n\*  
(#r<)t"t #n #utiet9/#nne/t#r) "re n)t"+e\*

5':'2'10'1 F# /e Te)t)3 T.e)e te)t) ")u1 e t. "t \* "+ t#ne )er, /e .")  
4een n)t"+e\*' C#nne/t t# t.e net (#r< nter-" /e \*e, /e "t  
t.e \*e1 "r/"t #n %# nt' G# #--- .##< "n\* +)ten "n\* re/e ,e  
" \* "+ t#ne' l- " te)t nu14er ) ", "+4e0 1 "<e "n\* re/e ,e  
" +#/" +0 +#n! \* )t"n/e0 "n\* \* ! t"+ )u4)/r %t #n 51 ( /)-0.9571 9291 ( )-r

PART 1 - GENERAL

1'1 SUMMARY

1'1'1 DESCRIPTION P \$(!)e COMMUNICATIONS INFRASTRUCTURE\* !n+,u)!n"  
-#+. -\$# )/\* te 0!n#!\$n )e(!+e/\* \$ut,et #n) & e0!/e 1! !n" #/ /2\$1n #n)  
/&e+!3!e) &e C\$nt #+t D\$+u0ent/'

1'1'2 Re,#te) Se+!\$n/4

1'1'3 D!(/!\$n 15\* #,, #&&,!+#-,e /e+!\$n/'

1'2 REFERENCES OF INDUSTRY STANDARDS TO ADHERE TO

1'2'1 TIA6EIA 758-B'1\* B'2\* B'3 - C\$0 0e +!#, Bu!,)!n" Te,e+\$0 0un!+#!\$n C#-,!n"  
St#n)# ) \* P# t 14 Gene #, Re9u! e0ent/\* P# t 24 B#,#n+e) T1!/te) P#! C#-,!n"  
C\$0&\$nent/ : P# t 34 O&t!+#, F!-e C#-,!n" C\$0&\$nent/ St#n)# )'

1'2'2 TIA6EIA 75;-A - C\$0 0e +!#, Bu!,)!n" St#n)# ) 3\$ Te,e+\$0 0un!+#!\$n/  
P#t21#</ #n) S&#e/\*

1'2'3 TIA6EIA 505-A-A) 0!n!/t #t!\$n St#n)# ) 3\$ C\$0 0e +!#, Te,e+\$0 0un!+#!\$n/  
In3 #/t u+tu e'

1'2'= ANSI6TIA6EIA-507-A4 C\$0 0e +!#, Bu!,)!n" G \$un)!n" #n) B\$n)!n"  
Re9u! e0ent/ 3\$ Te,e+\$0 0un!+#!\$n/'

1'2'7 TIA6EIA ;=2- Te,e+\$0 0un!+#!\$n/ St#n)# ) 3\$ D#t# Cente / >2007?

1'2'5 NETA ATS >Inte n#!\$n#, E,e+t !+#, Te/t!n" A//+\$!#!\$n?-A++e&t#n+e Te/t!n"  
S&e+!3!+#!\$n/ 3\$ E,e+t !+#, P\$1e D!/t !-ut!\$n E9u!&0ent #n) S</te0/'

1'2'7 A t!+,e 270 \$3 t2e 2001 C#,!3\$ n!# E,e+t !+#, C\$)e >CEC?'

1'2'8 A t!+,e 800 \$3 t2e 2001 C#,!3\$ n!# E,e+t !+#, C\$)e >CEC?'

1'2'; ANSI6NECA6BICSI Te,e+\$0 0un!+#!\$n/ D!/t !-ut!\$n Met2\$) / M#nu#, >TDMM?\*  
BICSI C#-,!n" In/t#,,#!\$n M#nu#, #n) BICSI LAN De/!"n M#nu#,\* BICSI  
Cu/t\$0e -O1ne) Out/!)e P,#nt De/!"n M#nu#,'

1'2'10 FCC P# t 78'700'

1'2'11 NFPA 70

1'3 DI@ISION OF RESPONSIBILITY

1'3'1 O1ne 4  
1'3'1'1 A,, L\$+#, A e# Net1\$ . >LAN? 2u- e9u!&0ent

1'3'1'3 Se (e R\$\$0 C#-!net/

1'3'2 C\$nt #+t\$ 4

1'3'2'1 A/ !n)!+#te) \$n &,#n/ #n) /&e+!#!+#!\$n/'

1'3'2'2 Te/t!n"

1'= SYSTEM DESCRIPTION

1'='1 H\$ !A\$nt#, P##21#<4 C\$N3\$ 0 t\$ TIA6EIA 75;-A\* u/!n" #+e1#<\* -#+. -\$# )/\*  
#n) +#!-!net/ #/ !n)!+#te)'

1'='2 G \$un)!n" S</te04 C\$N3\$ 0 t\$ TIA6EIA 5076;=2'

1'='3 @\$!+e B#+. -\$ne W! !n"4 C\$0&,ete 3 \$0 t2e M#!n C \$//-+\$nne+t t\$ e#+2  
Inte 0e)!#te C \$//-+\$nne+t\* u/!n" +\$&&e #n) \$&t!+#, 3!-e -#+. -\$ne +#!-,e/'

1'='= D##t# B#+. -\$ne W! !n"4 C\$0&,ete 3 \$0 t2e M#!n C \$//-+\$nne+t t\$ e#+2  
Inte 0e)!#te C \$//-+\$nne+t\* u/!n" \$&t!+#, 3!-e -#+. -\$ne +#!-,e/'

1'='7 @\$!+e H\$ !A\$nt#, W! !n"4 C\$0&,ete 3 \$0 2\$ !A\$nt#, C \$//-+\$nne+t/ t\$ e#+2  
\$ut,et u/!n" -#,#n+e) t1!/te) &#! 2\$ !A\$nt#, +#!-,e/'

1'='5 D##t# H\$ !A\$nt#, W! !n"4 C\$0&,ete 3 \$0 2\$ !A\$nt#, C \$//-+\$nne+t/ t\$ e#+2 \$ut,et

- 2'1'2'1 O t \$n!+/  
2'1'2'2 A&& \$(e) e9u#,
- 2'1'3 C\$&&e -#+. -\$ne +#-,e4  
2'1'3'1 BICC Gene #,  
2'1'3'2 A&& \$(e) e9u#,
- 2'1'= O&t!+#, 3!-e -#+. -\$ne +#-,e\* 2\$ !A\$nt#, +#-,e4  
2'1'='1 Su&e !\$ E//eC  
2'1'='2 BICC Gene #,  
2'1'='3 A&& \$(e) e9u#,
- 2'1'7 A,, 1! !n" #n) )e(!+e/ Ou/t -e 3 \$0 # /!n",e 0#nu3#+tu e \* \$ 3 \$0 # " \$u& \$3  
0#nu3#+tu e / t2#t 2#(e te#0e) t\$ "et2e t\$ & \$(!)e # /</te0 /\$,ut!\$n  
"u# #ntee) t\$ 0eet t2e &e 3\$ 0#n+e /&e+!3!+#!\$n'

2'2 SUBMITTALS

- 2'2'1 T2e 3\$, \$1!n" Ou/t -e /u- 0!tte) 1!t2!n >30? +#,en)# )#</ #3te #1# ) \$3 t2e  
+\$nt #+t #n) -e3\$ e 3#- !+#!\$n #n) !n/t#,,#!\$n \$3 #n< 0#te !#,'/ Su- 0!t 3\$  
#&& \$(# /!C >5? +\$&le/'
- 2'2'2 A +\$0&,ete ,!/t \$3 e9u!&0ent #n) 0#te !#,'/ !n+,u)!n" 0#nu3#+tu e 3/ )e/+ !&t!(e  
#n) +#!t#,\$" +ut/ /2eet/'
- 2'2'3 C\$0&#n< Ce t!3!+#!\$n4 T2e P \$&\$/e Ou/t -e +e t!3!e) -< t2e 0#nu3#+tu e \$3  
t2e /u- 0!tte) /</te0' l3 )!33e ent 0#nu3#+tu e / 1!,, -e u/e) t2e e Ou/t -e #  
+\$0&#n< +e t!3!+#!\$n 3\$ e#+2\* #n) !t/ u/e t\$ -e #&& \$(e) #n) #ut2\$ !Ae) -<  
C\$unt< Te,e+\$0 0un!+#!\$n/ St#33' T2e P \$&\$/e Ou/t & \$(!)e e(!)en+e \$3 t2!/  
+e t!3!+#!\$n #/ &# t \$3 t2e /u- 0!tt#, & \$+e//'
- 2'2'= F\$ e0#n #n) !n/t#,,e Ce t!3!+#!\$n4 T2e 3\$ e0#n \$(e /ee!n" t2e 0\$- #n) #,,  
+#+,e !n/t#,,e / 1\$ .!n" \$n t2e !n/t#,,#!\$n \$3 t2e +\$0 0un!+#!\$n/ +#+,!n" Ou/t  
-e +e t!3!e) -< t2e 0#nu3#+tu e \$3 t2e /u- 0!tte) /</te0' T2e P \$&\$/e Ou/t  
& \$(!)e e(!)en+e \$3 !t/ +e t!3!+#!\$n t\$ !n/t#,, t2e & \$&\$/e) +\$0 0un!+#!\$n/ +#+,e  
#n) +\$0&\$nent/'
- 2'2'7 Te/t Re&\$ t/4 P \$(!)e /#0&,e te/t e&\$ t/ 3\$ +\$&&e \* 3!-e \* et+'
- 2'2'5 A,, /u- 0!tt#,/ Ou/t -e +2e+.e) -< t2e C\$nt #+t\$ 3\$ +\$n3\$ 0#n+e t\$ t2e  
e9u! e0ent/ \$3 t2e +\$n/t u+#!\$n )\$+u0ent/ -e3\$ e 3\$ 1# )!n" 3\$ #&& \$(# , -<  
C\$unt< Te,e+\$0 0un!+#!\$n/ St#33 C\$nt #+t\$ Ou/t -e e/&\$n/!-,e 3\$ #,,  
9u#nt!t!e/ #n) e \$ / \$ \$0!//!\$n/ \$3 /u- 0!tt#,/'

2'3 EUALIFICATIONS

- 2'3'1 M#nu3#+tu e 4 C\$0&#n< /&e+!#,!A!n" !n 0#nu3#+tu !n" & \$)u+t/ /&e+!3!e) !n t2!/ /e+t!\$n 1!t2 0!n!0u0 t2 ee >3? <e# / eC&e !en+e'
- 2'3'2 !n/t#,,e 4 C\$0&#n< /&e+!#,!A!n" !n !n/t#,,!n" & \$)u+t/ /&e+!3!e) !n t2!/ /e+t!\$n 1!t2 # 0!n!0u0 t2 ee >3? <e# / eC&e !en+e\* #n) 1!t2 /e (!+e 3#+!,!t!e/ 1!t2!n 100 0!,e/ \$3 & \$!e+t\* n\$ eC+e&t!\$n/'
- 2'3'3 T2 ee >3? e3e en+e/ 3 \$0 & \$!e+t/ \$3 /!0!,# /!Ae #n) /+\$&e 1!t2!n t2e ,#/t <e# '
- 2'3'= Re9u! e) !n/u #n+e/\* Gene #, L!#-!,!t< #n) W\$ . 0#nF/ C\$0&en/#t!\$n !n ##++\$ )#n+e 1!t2 t2e C\$unt<f/ /&e+!3!+ !n/u #n+e e9u! e0ent/'
- 2'3'7 T2e #-!,!t< t\$ & \$(!)e # 0#nu3#+tu e F/ 1# #nt< #/ )e/+ !-e) !n t2e W# #nt< Se+t!\$n \$3 t2!/ )\$+u0ent'

2'= PRE-INSTALLATION CONFERENCE

- 2'='1 S+2e)u,e # +\$n3e en+e # 0!n!0u0 \$3!(e >7? +#,en)# )#</ & !\$ t\$ -e"lnn!n" 1\$ . '
- 2'='2 C,# !3< #n< 9ue/t!\$n/ e,#te) t\$ t2e 1\$ . t\$ -e &e 3\$ 0e)\* /+2e)u,!n" #n) +\$ \$ )!n#!t!\$n \$3 0#te !#,/\* 1\$ .!n" 2\$u /\* et+
- 2'='3 C\$n3! 0 1 !tten /u-0!tt#, #n) 1 !tten +2#n"e & \$+e//'

2'7 TELECOMMUNICATIONS GROUNDING

- 2'7'1 C\$nt #+t\$ !/ e9u! e) t\$ !n/t#,, # +\$0&,ete te,e+\$0 0un!+#!t!\$n/ " \$un)!n" /</te0 !n +\$0&,!#n+e 1!t2 ANSI6TIA6EIA-5074 C\$0 0e +!#, Bu!,)!n" G \$un)!n" #n) B\$n)!n" Re9u! e0ent/ 3\$ Te,e+\$0 0un!+#!t!\$n/ >2002?\* TIA6EIA ;=24 Te,e+\$0 0un!+#!t!\$n/ St#n)# ) 3\$ D##t# Cente / >2007?'
- 2'7'2 M#nu3#+tu e 4
- 2'7'3 DAMAC\* !n+'
- 2'7'= A&& \$(e) e9u#,
- 2'7'7 P \$)u+t De/+ !&t!\$n4 DAMAC PLR1210-3 \$ A&& \$(e) e9u#,' U'L' ,!/te)\* & e) !,e)\* e,e+t \$t!n &,#te) +\$&&e -u/-# 1!t2 2\$,e/ 3\$ /t#n)# ) /!Ae) 2 2\$,e +\$0& e//!\$n /t<,e ,u" / 0\$unte) \$n 2-!n+2 !n/u,#t\$ /'
- 2'7'5 D!0en/!\$n/4 = !n+2e/ !!)e C G !n+2 t2!+. C 20 !n+2e/ ,,\$n''

2'5 TELEPHONE TERMINATION BACHBOARDS

- 2'5'1 P \$)u+t De/+ !&t!\$n4 F! e et# )#nt P,<1\$\$)'





2'8'3 D!/t !-ut!\$n R!n" /6!u0&e T \$u"2/

2'8'3'1 P \$)u+t De/+ !&!\$n4 P#n)ul! P110ITW-J \$ #&& \$(e) e9u#,'

2'8'3'2 L\$+#!\$n4 On #,, -#+. -\$# )/ #/ e9u! e) 3\$ \$ut!n" 3\$ (\$!+e +#-,e/ !n #  
ne#t 3#/2!\$n'

2'; CABLE LADDERS

2';'1 P \$)u+t De/+ !&!\$n4 DAMAC PLR1210-3 \$ #&& \$(e) e9u#,'

2';'2 D!0en/!\$n/4 12 !n+2 1!)e\* 1!t2 /!)e -# / 1 !n+2 t\$ 2 !n+2 2!"2'

2';'3 P \$(!)e #,, 2# ) 1# e\* t1\$ 2\$,e +\$0& e//!\$n /t<,e " \$un)!n" ,u"/\* t1\$ 2\$,e  
+\$0& e//!\$n /t<,e " \$un)!n" /t #&/\* 3#/tene /\* #n) ,#))e 0\$unt!n" - #+.et/'

2'10 OPTICAL FIBER ENCLOSURES AND COUPLER PANELS

2'10'1 P \$)u+t De/+ !&!\$n4 O t \$n!+/ ORFC03UC\* \$





2'22'= P \$(!)e JJ e#\* 2 0ete / !n ,en"t2\* LC t\$ LC\* Du&,eC 3!-e Du0&e / \* A,,en Te,,  
P \$)u+t/\* \$ #/ e9u! e) 3\$ /&e+3!+ & \$De+t n\$te/'

2'23 CABLE SUPPORTS

2'23'1 M#nu3#tu e /4

2'23'1'1 C#) <

2'23'1'2 E !+\$

2'23'1'3 A&& \$(e) e9u#,

2'23'2 P \$)u+t De/+ !&t!\$n4 W!)e B#/e l 2\$\$ . / \$ C#- ,e S,!n" / 0\$unte) t\$  
!n)e&en)ent +e!,!n" 1! e/ 3\$ / 0#,,e +#-,e &#t21#</' C,!&/ 0u/t +\$0&< 1!t2  
UL\* CUL\* CEC #n) TIA&EIA e9u! e0ent/ 3\$ /t u+tu e) +#-,!n" /</te0/' See  
) #1!n" )et#!,/' E#+2 , \$1 (\$,t#"e /</te0 /2#,, 2#(e !t/ \$1n !n)e&en)ent  
/u&&\$ t /</te0' >D\$ n\$t u/e /e+u !t< /</te0\* CCT@\* 3! e\* 2#n"e / et+'?

2'2= SLEE@ES

2'2='1 P \$)u+t De/+ !&t!\$n4 F! e R#te) W#,,/ 0u/t -e &enet #te) 1!t2 STI EK-PATH O  
B #n)\* \$ #&& \$(e) e9u#,\* )e(!+e 0\$)u,e/ +\$0& !/e) \$3 /tee, #+e1#< 1!t2  
!ntu0e/+ent 3\$#0 &#) / #,, \$1!n" 0 % 100 &e +ent +#-,e 3!,, ' Un #te) 1#,,/ 0#< -e  
&enet #te) 1!t2 = !n+2 +\$n)u!t /,ee(e/\* & \$(!)e) 1!t2 ) #3t /t\$& 0#te !#,' Re3e  
t\$ Se+t!\$n 250783'

2'27 CABLE LABELS

2'27'1 M#nu3#tu e /4

2'27'1'1 O t \$n!+ /

2'27'1'2 A&& \$(e) e9u#,

2'27'2 P \$)u+t De/+ !&t!\$n4 1 #&-# \$un) / 0\$.e #te) ,#-e,/\* ne#t,< 2#n) 1 !tten \$

2'27 CABLE TIES AND ACCESSORIES

2'27'1 H\$\$\$. #n) ,\$\$& +#-,e 1 #&/\* +#-,e +,#0&/\* /&,lt 0e/2 " !&/\* +#-,e 2\$\$\$. / \* #n)  
+ #-,e /u&&\$ t/\* #/ e9u! e) t\$ /u&&\$ t t2e +#-,e/ #n) ) e// t2e +#-,e/ !n # t!)<  
0#nne ' H\$\$\$. #n) ,\$\$& +#-,e 1 #&/ # e t\$ ut!,!Ae) 3\$ #,, C#' 5 #n) 3!-e  
+ #-,!n"

2'28 OTHER HARDWARE

2'28'1 S+ e1/\* 1#/2e /\* nut/\* ,u"/\* -\$ ,t/\* #n) \$t2e 2# ) 1# e e9u! e) 3\$ t2e & \$&e  
!n/t#,,#t!\$n \$3 t2e +#-,!n" /</te0'

PART 3 - EJECTION

3'1 EJISTING WORH

3'1'1 En/u e #++e// t\$ eC!/t!n" te,e+\$0 0un!+#t!\$n/ e9u!&0ent\* + #-,!n"\* #n)  
te 0!n#!t!\$n/ #n) \$t2e !n/t#,,#t!\$n/ 12!+2 e0#!n #+t!(e #n) 12!+2 e9u! e  
#++e// ' A,, EC!/t!n" /</te0/ /2#,, -e & \$te+te) 3 \$0 )u/t #n) )e- !/\* #n<  
)#0#"e e/u,t!n" 3 \$0 )u/t \$ )e- !/ /2#,, -e #t t2e eC&en/e \$3 t2e C\$nt #+t\$ '  
!n+,u)!n" #n< +,e#nu& \$3 eC!/t!n" e9u!&0ent'

3'2 PERFORMANCE

3'2'1 A,, !n/t#,,#t!\$n 1\$ . 0u/t -e )\$ne -< 9u#,!3!e) 6 0#nu3#+tu e +e t!3!e)  
+ #3t/&e\$&,e !n # ne#t\* 2!" 2 9u#,lt< 0#nne #n) 0u/t +\$n3\$ 0 t\$ t2e 0\$/t  
/t !n"ent \$3 #&&,!+ #-,e , \$+ #, /t#te\* 3e) e #, -u,)!n" +\$)e/\* #n) e3e en+e)  
/t#n)# )/'

3'2'2 C\$nt #+t\$ 0u/t & \$(!)e # & \$De+t 0#n#"e 12\$ 2#/ )e0\$N/t #te) t2e #-,!t< t\$  
/u&e (!/e # & \$De+t \$3 t2!/ 0#"n!tu)e'

3'2'3 Ce!,!n" t!,e/ - \$.en \$ )e3#+e) -< t2e C\$nt #+t\$ )u !n" t2e !n/t#,,#t!\$n #n)  
te/t!n" & \$+e// 0u/t -e e&,#+e) #t t2e eC&en/e \$3 t2e C\$nt #+t\$ '

3'2'= C\$nt #+t\$ 1!,, -e e/&\$n/!-,e 3\$ #,, 3 e!"2t +2# "e/ e,#te) t\$ 0#te !#,  
&u +2# /e/' F#!,u e t\$ \$ )e 0#te !#,/ !n # t!0e,< 0#nne e/u,t!n" !n #) )e)  
3 e!"2t +2# "e/ \$ #(#!,#-!,!t< !//ue/ 1\$u,) n\$ -e +\$n/!)e e) # (#,!) e#/\$n t\$  
/u- /t!tute 0#te !#,/'

3'3 INSTALLATION

3'3'1 !n/t#,, te 0!n#!t!\$n -#+. -\$# )/ #n) #+./ &,u0 - \* #n) #tt#+2 /e+u e,< t\$ -u,)!n"  
1#,, #t e#+2 +\$ ne '

3'3'2 Te,e&2\$ne B#+. -\$# ) 0u/t -e +\$n3!"u e) !n # 0#nne t2#t &,#+e/ te,e&2\$ne  
-,\$+./ \$n t2e ,e3t 2#n) /!)e #n) 3ee) -,,\$+./ \$n t2e !"2t 2#n) /!)e \$3 t2e -\$# )  
\$ !n # 0#nne t2#t 2#/ -een & e#&& \$(e) -< C\$unt< Te,e+\$0 0un!+#t!\$n/ St#33'  
A)e9u#te 1! e 0#n#"e0ent )!t !-ut!\$n !n" / 0u/t -e &,#+e !n #n # #n"e0ent



TELECOMMUNICATION CABLING AND PATHWAYS  
SECTION 273000-12

3'3'5'8 En/u e t2#t " \$un)ln" ,u"/ 0#.e # 0et#,-t\$-0et#, +\$nt#+t 1lt2 #,,  
e9ul&0ent #+./ \* +#-,e t #< /\* ,#) )e / #n) " \$un) /,ee(e/' Re0\$(e &#!nt  
3 \$0 /u 3#+e/ #/ nee)e)'

3'3'7 In/t#,, &#t21#</ !n #++\$ )#n+e 1lt2 TIA6EIA 75;-A'

3'3'7'1 C#-,e +,#0&/ \$ /u&&\$ t/ # e nee)e) 3\$ !/e -#+. -\$ne +#-,e/' C#-,e  
2\$\$./ # e e9u! e) 3\$ 2\$ !A\$nt#, +#-,!n''

3'3'7'2 In/t#,, +,!&/ t\$ & \$(!)e /t #!n e,!e3 #n) \$ute +#-,e/ /\$ -en) #)!u/  
+\$n3\$ 0/ t\$ TIA6EIA 758B /t#n) # )'

3'3'7'3 C\$nt #+\$ 1!,, -e e/&\$n/!-,e 3\$ en"!nee !n" 9u#nt!tle/ \$3 #n) !n/t#,,!n"  
#n< ne+e//# < 1! e -#/ .et\* 3,eC!-,e 0et#, t #<\* I-2\$\$./ #n)6\$ +#-,e  
/,!n" / 3\$ \$ut!n" +#-,e/ !n +e!,!n" /&#+e' F,eC!-,e +#-,e 0#n#"e0ent  
t #< 0u/t -e /u&&\$ te) &e 0#nu3#+tu e /F !n/t u+t!\$n/' T2e< /2\$,.) #,/\$  
-e &,#+e) #t e(e < ) \$& &\$!nt /u+2 #/ +\$n)ult /tu--u&\* 1lt2\$ut eC+e&t!\$n\*  
#n) 12e e(e /u&&\$ t!/ nee)e) t\$ #(\$!) /#" "ln" \$ t\$ #(\$!) t\$u+2!n"  
&!&!n"\* )u+t!n" \$ \$t2e t #)e/ß 1\$ . ' Att#+2!n" \$ ) #&!n" +#-,e/ t\$  
+e!,!n" 1! e " !)\* \$t2e &!&e/\* ,!" 2t 3!Ctu e/\* et+!\* 1!,, nSt -e &e 0!tte)'  
R#t2e C\$nt #+\$ 0u/t & \$(!)e /e&# #te +e!,!n" 1! e 3\$ /e+u !n" I-  
2\$\$./ ' U/e \$3 t2e +e!,!n" " !) 1! e !n/t#,,e) -< \$t2e / !/ nSt &e 0!tte)'

3'3'7'= A,, /,ee(e/ 0u/t -e 3! e & \$\$3e) #/ e9u! e)' Se#, #,, /,ee(e/ #3te +#-,!n"  
2#/ -een te/te) #n) #&& \$(e)' A,, e0&t< /,ee(e/ 0u/t -e /e#,"e'

3'3'7'7 Re&,#+e0ent &u,, \$&e/ 0u/t 0#t+2 t2e \$ !"ln#, &u,, \$&e/ !n/t#,,e) !n t2e  
!nte -)u+t/'

3'3'8 In/t#,, 1! e #n) +#-,e !n #++#n)\$\$ 3811.48( ) -767.9025(/) -0.95-5.150 07(2) 0.590251(e



TELECOMMUNICATION CABLING AND PATHWAYS  
SECTION 273000-13

3'3'8'5 A,, eCte !\$ +\$n)ult/ /2#,, -e /e#,e) ut!,!A!n" #&& \$(e) &utt< \$ /e#,e t\$  
& e(ent #n!0#, #n) 1#te !nt u/!\$n !nt\$ /&#+e'

3'3'8'7 W2en !n/t#,,!n" +-,-e/ !n +\$n)ult/ 1!t2 &u,,-/t !n"/\* e&,#+e &u,,-/t !n"/  
u/e) 1!t2 ne1 \$ne/'

3'3'8'8 In n\$ e(ent 0u/t #n< 2\$ !A\$nt#, +-,-e/ -e /&,!+e) -et1 een te,e+\$0 0  
\$\$0 / #n) 1\$ ./t#!\$n/'

3'3'8'; N\$ 2\$ !A\$nt#, +-,-e un/ ,e// t2#n 3!t< 3eet !n ,en"t2 1!,, -e &e 0!tte)'

3'3'8'10 F!-e \$&t!+ +-,-e t\$ 2#(e 30 3t /e (!+e ,\$\$&/ & !\$ t\$ ent < !nt\$ F!-e  
O&t!+ En+,\$/u e/' Ne#t,< +\$!, #n) /e+u e /e (!+e ,\$\$&/ \$n ne# e/t 1#,,  
& !\$ t\$ ente !n" #+. \$ +-,-!net'

3'3'8'11 H\$ !A\$nt#, /t#!\$n +-,-!n" 0u/t 2#(e n\$ ,e// t2#n 10 3t /e (!+e ,\$\$&/ #t  
t2e /t#!\$n en) #n) 7 3t #t t2e &#t+2 &#ne, en)' In t2e +#/e \$3 2\$0e un  
+\$n)ult ut!,!A#!\$n #,, /,#+. >17 3t? 1!,, -e +\$!,e) #t t2e -#+. -\$# ) en)  
#3te #&& \$(#, -< Te,e+\$0 0un!+#!\$n/ /t#33 #/ t\$ )e/!"n'

3'3'8'12 In +u-!+,e 1\$ ./t#!\$n ,#+#!\$n/\* e#+2 1\$ ./t#!\$n # e# 1!,, 2#(e t1\$  
>2? +\$0 0un!+#!\$n 3u n!tu e 3#+e&,#te/ !3 0\$ e t2#n 3\$u +-,-e/ # e  
!n)!+te) \$n ) #1!n"/' T2e 3#+e&,#te/ 1!,, -e /e&# #te) 1!t2 #/ /2\$1n  
\$n t2e ) #1!n"/' A,, +u-!+,e 3u n!tu e 3#+e&,#te/ 1!,, e9u! e 3#+e&,#te  
eCten)e /'

3'3'; T2e C\$nt #+t\$ 0u/t en/u e t2#t #,, 3,\$\$ #n) 1#,, &enet #t!\$n/ 1!,, -e 3! e-/t\$&  
#te) t\$ t2e /#t!/3#+t!\$n \$3 C\$unt< Te,e+\$0 0un!+#!\$n/ #n) #/ e9u! e) -<  
#&&,!+#+,-e +\$)e/' P \$(!)e 3! e /t\$&\* #3te +-,-e/ 2#(e -een !n/t#,,e) \* te/te) #n)  
)\$+u0ente)'

3'='3 H\$ !A\$nt#, Lln. L#-e,!n" S+2e0e4

3'='3'1 H\$ !A\$nt#, +#-,e/ # e t\$ -e ,#-e,e) #t -\$t2 en) / !n +\$0&!#n+e 1!t2 t2e  
TIA&EIA 505-A St#n)# ' T2e &un+2 )\$1n -,\$+./&#t+2 &#ne,/ \* #n) 3#+e  
\$3 t2e 1\$ ./t#!\$n \$ut,et/ 0u/t -e ,#-e,e) 1!t2 0#+2!ne ,#-e,/'

3'='3'2 C#-,e 0u/t -e !)ent!3!e) 1!t2 t2e 3\$,, \$1!n"4

3'='3'3 Bu,)!n" nu0 -e >P \$(!)e) -< C\$unt< Te,e+\$0 0un!+#!\$n/?

3'='3'= C,\$/et nu0 -e \$ te,e+\$0 0un!+#!\$n/ B#+. -\$# ) nu0 -e

3'='3'7 St#!\$n nu0 -e

3'='3'5 l#+. nu0 -e

| I#+. De/!"n#t\$ 4 | U/e4    | De/!"n#!\$n4 |
|-------------------|---------|--------------|
| C\$,\$ 4          |         |              |
| I(\$ <            | @#!+e 1 | @1           |
| I(\$ <            | D## 1   | D1           |
| I(\$ <            | D## 2   | D2           |
| I(\$ <            | D## 3   | D3           |
| G een             | WAP 1   | W=           |
| G een             | WAP 2   | W7           |

3'='3'7 An eC#0&,e \$3 # +#-,e ,#-e, !/ /2\$1n \$n t2e ) #1!n" /' F!n#, \$ut,et #n)  
-,\$+., #-,e,!n" 0et2\$) / t\$ -e && \$ (e) -< C\$unt< Te,e+\$0 0un!+#!\$n/  
St#33 -e3\$ e ,#-e,!n" !/ )\$ne \$n \$ut,et/ #n) -,\$+./'

3'='3'8 M# . t2e en) / \$3 t2e +#-,e e(e < 12 !n+2 3\$ = 3eet' A,, 1\$ ./t#!\$n  
\$ut,et/ 0u/t -e ,#-e,e) #/ !)ent!3!e) &e t2e ) #1!n" /'

3'='3'; A,, L#-e,!n" #t 1\$ ./t#!\$n #n) &#t+2 &#ne, en) / /2#,, -e +\$0&,ete)  
& ! \$ t\$ te/t!n"

3'='3'10 @#!+e Te 0ln#!\$n F #0e/ 0u/t 2#(e B,ue De/!"n#!\$n St !&/'

3'='3'11 D## P#t+2 P#ne,/ 0u/t 2#(e W2!te De/!"n#!\$n L#-e,/'

3'='3'12 L#-e, #,, H\$ !A\$nt#, F!-e O&t!+ C#-,e!lne )u+e (e < 70f !n \$&en  
# e#/ 1!t2 M#nu3#+tu e) F!-e O&t!+ C#ut!\$n W# n!n" T#"/ ,#-e,  
/2#,, /t#te 3!-e +\$unt\* t\$ #n) 3 \$0 )e/!"n#t\$ / #n) )#te \$3 !n/t#,,#!\$n'

3'='3'13 A,, (\$!+e 3 #0e/ #n) )## &#t+2 &#ne,/ 0u/t -e nu0 -e e) /e9uent!#,,<  
!n # n\$- e+u !n" 0#nne ' Nu0 -e !n" 0u/t !n+,u)e -u,)!n"  
nu0 -e 6-#+. -\$# ) e/!"n#t\$ \* &,u/ /t#!\$n nu0 -e /t# t!n" #t 1 #n)  
+\$nt!nue t\$ t2e 2!"2e/t nu0 -e e9u! e)' A,, /t#!\$n/ 0u/t -e  
nu0 -e e) #t t2e! te 0!n#!\$n en) / -< # 0#+2!ne 0#) e ,#-e, #n)  
#tt#+2e) t\$ t2e 3#+e&,#te'

3'='3'1= @\$!+e Te 0!n#!\$n F #0e nu0 -e !n" 0u/t /t# t #t t2e u&&e ,e3t 2#n)  
+\$ ne \$3 t2e te 0!n#!\$n -, \$+. #n) & \$+ee) 3 \$0 ,e3t t\$ !"2t\* t\$& t\$  
-\$tt\$0 \$3 -, \$+. /e9uent!#, ,<' D#t# P#t+2 P#ne, nu0 -e !n" 0u/t /t# t #t  
t2e u&&e ,e3t-2#n) +\$ ne \$3 t2e &#ne, #n) & \$+ee) 3 \$0 ,e3t t\$ !"2t  
#n) t\$& t\$ -\$tt\$0 /e9uent!#, ,<'

3'7 CONDUITS

3'7'1 A,, +\$n)u!t/ 3\$ +\$0 0un!+#t!\$n/ +#-,e/ 0u/t4

3'7'1'1 H#(e #n #&& \$(e) &u,, !e 1!t2 # 0!n!0u0 &u,,!n" ten/!\$n \$3 200 , -/'

3'7'1'2 Be & \$&e (#).93321( ) -5.150 07(1) 11.4807(0) -5.55953( ) -07(&) 0.590251(u)  
3'7'1'2 H#(e # \$&n!606158(t) -5.10251( " ) 0.590251( ) -5.150 07(t) -5.1 -251 (&) 0.590

TELECOMMUNICATION CABLING AND PATHWAYS  
SECTION 273000-15

|        |     |     |     |
|--------|-----|-----|-----|
| 3N     | 20N | =2N | 12N |
| 3 162N | 30N | =8N | 2=N |
| =N     | 30N | 50N | 2=N |

3'7'= Pu,, -\$Ce/ Ou/t -e & \$(!)e) 1!t2 !nte n#, 1#, #+. #//e0 -,!e/ t\$ /u&&\$ t  
+#+-,!n''

3'7'=1 Pu,, -\$C ,!)/ 1!, -e \$3 t2e -\$t )\$1n \$ ,\$.ln" t&e !3 e9u! e) #n)  
+\$n/t u+te) \$3 t2e /#0e 0#te !#, #/ t2e -\$C 1!t2 eC+e&t!\$n t\$ t #33!+  
#te) #&&,!+#!\$n/'

3'5 TESTING

3'5'1 A,, +\$&&e #n) 3!-e +#+-,e/ Ou/t -e te/te) ut!,!A!n" t2e & \$&e +#te"\$ < #te)  
te/t/'

3'5'2 A,, 2\$ !A\$nt#, +#+-,e/\* \$ut,et/ #n) te 0!n#!\$n/ Ou/t 0eet \$ eC+ee) #,,  
&e 3\$ 0#n+e /&e+!3!+#!\$n/ )e/!"n#te) -< ANSI\* TIA&EIA 758B2-1\* #n) IEEE'

3'5'3 A,, 3!-e \$&t!+ +#+-,!n" Ou/t -e te/te) en)-t\$-en) 3\$ \$(e #,, )- ,\$/ /# 870n0 #)  
1300 n0 3\$ Ou,t!-0\$)e #n) 1310 n0 #n) 1770 n0 3\$ /!n",e-0\$)e !n -\$t2  
)! e+t!\$n/' Fl-e O&t!+ C\$ne+t\$ )- ,\$/ / Ou/t -e 0'7 \$ ,e/!

3'5'= Te/t!n" #n) ,#-e,!n" Ou/t -e +\$0&,ete) \* 1!t2 te/t e/u,t/ & e/ente) t\$ t2e  
O1ne n\$ ,#te t2#n t2 ee >3? )#</ & !\$ t\$ & \$De+t +\$0&,et!\$n'

3'5'7 Te/t!n" \$3 t2e &e 0#nent ,!n. #/ )e3!ne) -< TIA&EIA 758B2-1\* #n) !n+,u)!n" t2e





3'11 OUTSIDE UTILITY SER@ICE

3'11'1 C\$nt #+\$ 0u/t #)2e e t\$ \$ut/!)e ut!,lt< 0!n!0u0 /&e+!3!e) e9u! e0ent/ 3\$  
t en+2!n"\* +\$n)u!t\* -\$Ce/ #n) 0#n2\$,e/\* #e !#, ent #n+e 0#/t/\* /e (!+e +#!-!net/\*  
-\$n)!n" #n) " \$un)!n"' T2!/ !n+,u)e/ e9u! e0ent/ 3\$ #&& \$(#, \$3 )e/!"n &,#n/  
& !\$ t\$ /e (!+e !n/t#,,#!\$n'

3'12 GENERAL NOTES AND REEUIREMENTS

3'12'1 Su- /!tut!\$n/ \$3 0#te !#, \$ & \$)u+t 0u/t -e #&& \$(e) -< C\$unt<  
Te,e+\$0 0un!+#!\$n/F St#33 & !\$ t\$ #1# ) \$3,\$1 (\$,t#"e +\$nt #+\$ \$ ' A,,  
+\$ e/&\$n)en+e /2#,, -e !n 1 !t!n" 3\$,,\$1!n" t2e & \$!e+t 0#n#"e0ent & \$+e//'

3'12'2 Gene #, +\$nt #+\$ /2#,, -e e/&\$n/!-,e 3\$ (e !3!+#!\$n \$3 /u-+\$nt #+\$ \$ F/  
+\$0&,#n+e t\$ -#/e -!) /&e+!3!+#!\$n/' C\$unt< /2#,, n\$t -e 2e,) e/&\$n/!-,e 3\$  
/u-+\$nt #+\$ \$ F/ n\$n +\$0&,#n+e 1!t2 /&e+!3!+#!\$n e9u! e0ent/ #/ ,!/te) !n t2!/  
)\$+u0ent'

3'12'3 T2!/ /&e+!3!+#!\$n )\$+u0ent /u&e /e) #n< ) #1!n" \$ -!) )\$+u0ent un,e//  
\$t2e 1!/e #&& \$(e) -< C\$unt< Te,e+\$0 0un!+#!\$n/ St#33 !n 1 !t!n"

END OF SECTION





1(3(1(5 'r#, 8e "r\*er 8"!r" . /#r t)e \*3\*te . \*)#2 n! n te+)n+"113 "++ur"te  
8et" 1 "11 +#nne+t #n\*6 nter+#nne+t #n\*6 "n8 "11 &r#, \* #n\* " , " 1"9le  
"n8 . "8e /#r "8"&t"9 1 t3 #/ "11 \*e+/ e8 /uture /un+t #n\* "n8 n+lu8 n!  
"11 +"1+u1"t #n\*6 +) "rt\*6 "n8 te\*t 8"t" ne+e\*\*"r3 t# 8e . #n\*tr"te t) "t "11  
\*3\*te . \* "n8 \*3\*te . +# . &#nent\* 8e1 ,er t)e \*e+/ e8 \* !n"1\*6 !r"8e\*6  
"n8 le,e1\* "t "11 re-u re8 &# nt\* "n8 1#+"t #n\*(

1(3(1(< Su9 . t " +ert /+"te #/ +# . &let #n #/ n\*t"11"t #n "n8 \*er, +e tr" n n!(

1(; >UALITY ASSURANCE

1(;(1 All te . \* #/ e-u & . ent n+lu8 n! 2 re "n8 +"9le \*) "11 9e 8e\* !ne8 93 t)e  
 . "nu/"+turer t# /un+t #n " \* " +# . &lete \*3\*te . "n8 \*) "11 9e "++# . &"n e8 93 t)e  
 . "nu/"+turer)\* +# . &lete \*er, +e n#te\* "n8 8r"2 n! \* 8et" 1n! "11  
 nter+#nne+t #n\*(

1(;(2 T)e C#ntr"+t#r \*) "11 9e "n e\*t"9l \*) e8 +# . . un +"t #n\* "n8 e1e+tr#n +\*  
+#ntr"+t#r t) "t ) " \* ) "8 "n8 +urrent13 . " nt" n\* " 1#+ "113 run "n8 #&er"te8  
9u\* ne\*\* /#r "t le"\*t / ,e @5A 3e"r\*( T)e C#ntr"+t#r \*) "11 ut 1 Be " 8u13  
"ut)#r Be8 8 \*tr 9ut#r #/ t)e e-u & . ent \*u&&1 e8 /#r t) \* &r#e+t 1#+ "t #n  
2 t) /u11 . "nu/"+turer)\* 2 "rr"nt3 &r , le!e\*(

1(;(3 T)e C#ntr"+t#r \*) "11 \*)#2 \*t \*/"+t#r3 e, 8en+e8 u&#n re-ue\*t6 t) "t t)e \*u&&1 er  
 . " nt" n\* " /u113 e-u &&e8 \*er, +e #r!"n B"t #n +"&"9le #/ /urn \*) n! "8e-u"te  
n\*&e+t #n "n8 \*er, +e t# t)e \*3\*te . ( T)e \*u&&1 er \*) "11 . " nt" n "t ) \* /"+1 t3  
t)e ne+e\*\*"r3 \*&"re &"rt\* n t)e &r#&er &r#&rt #n " \* re+# . . en8e8 93 t)e  
 . "nu/"+turer t# . " nt" n "n8 \*er, +e t)e e-u & . ent 9e n! \*u&&1 e8(

1(;(; E1e+tr+"1 C# . &#nent St"n8"r84 'r#, 8e 2#r7 +# . &13 n! 2 t) "&&1+"9le  
re-u re . ent\* #/ t)e C"1/#rn " E1e+tr+"1 C#8e @CECA n+lu8 n!6 9ut n#t 1 . te8 t#4

1(;(;(1 Art +le 25\$6 Gr#un8 n!(

1(;(;(2 Art +le 3\$66 ' "rt A( W r n! Met)#8(

1(;(;(3 Art +le 31\$6 C#n8u+t#r\* /#r Gener"1 W r n!(

1(;(;(; Art +le 7256 Re . #te C#ntr#16 S !n"1n! C r+u t\*(

1(;(;(5 Art +le D\$66 C# . . un +"t #n S3\*te . \*(

1(;(5 T)e " !en+3 &r#, 8 n! e-u & . ent \*) "11 9e re\*#n\* 9le /#r &r#, 8 n! "11  
\*e+/ e8 e-u & . ent "n8 . ent #ne8 \*er, +e\* /#r "11 e-u & . ent " \* \*e+/ e8  
)eren(

1(;(< T)e \*u&&1 er \*) "11 , \* t t)e \* te\* "n8 / . 1 "rBe ) . \*e/ 2 t) t)e e0 \*t n!  
+#n8 t #n\* "n8 /e18 re-u re . ent\* &r #r t# \*u9 . tt n! " &r#&#\*"1(

1(5) DELIVERY, STORAGE AND HANDLING

1(5)(1) Deliver and store materials in accordance with the manufacturer's instructions for handling, storage, and use. The contractor shall be responsible for obtaining and maintaining all necessary permits for the storage and handling of materials.

PART 2 - PRODUCTS

2(1) MANUFACTURER

2(1)(1) Name of manufacturer shall be provided for all materials and equipment.

2(1)(2) All materials and equipment shall be new, unused, and of the highest quality available. The contractor shall provide evidence of the manufacturer's reputation and track record.

2(2) CLOSURES, SEALS AND ENCLOSURES

2(2)(1) Closures, seals, and enclosures shall be installed in accordance with the manufacturer's instructions.

2(<3 ' r#, 8e " Rl ;5 t3&e C"te!#r3 <D-&n . #8u!"r C"+7 "t t)e \*t"t #n en8 #/ "11 ; &" r  
+"9le\*( A11 C"+7\* 2 11 u\*e t)e ANSI5TIA T5<D= 2 rn! +n/ !ur"t #n( ' r#, 8e  
. #8u!"r C"+7 2 "11&1"te\* n Ee3\*t#ne @>u+7 ' #rtA /#r . "t( U\*e +# . . #n 2 "11&1"te\*  
2 t) 8"t" C"+7\* 2)ere "&&1+"9le(

2(<(; T2 \*te8 ' " r Entr"n+e "n8 D \*tr 9ut #n C"9le4 A11 t2 \*te8 &" r entr"n+e +"9le\*  
\*)"11 9e C"te!#r3-36 22 ! "u!e6 t2 \*te8 &" r\*( T)e3 \*) "11 +# . &13 2 t) UL "n8  
CEC Art +le D\$\$ re-u re . ent\*( In8##r +"9le \*) "11 9e r"te8 /#r t)e  
en, r#n . ent6 CM /#r n#n &lenu . 5r \*er "re"\* "n8 CM' /#r r \*er "n8 &lenu .  
"re"\*( Out8##r +"9le \*) "11 9e \*u t"9le /#r 8 re+t 9ur "16 OS' t3&e(

2(<(5 Ter . n"te Entr"n+e "n8 D \*tr 9ut #n +"9le\* #n 11\$ 9!#+7\* 2 t) le! \* #r &"t+)  
&"ne!\* #n r"+7( ' r#, 8e +r#\*\* +nne+t +"9!n! n/r"\*tru+ture /#r . 2 "11 9!#+7\* t#  
\*t"t #n +"9le &"t+) &"ne!\*(

2(7 MISCELLANEOUS

2(7(1 F#r "11 \*3\*te . \*6 &r#, 8e &er &)er"1 8e, +e\* "n8 "+e\*\*#r e\* "\*" nee8e8 t# . eet  
\*3\*te . \*J nee8\*( T) \* n+!u8e\* &#2025!(1)4 . 192( ) -5 . 325!(8)0 . 589606( ) -5 . 3189!( ' ) 2 . 685 . 735!(

3(2; C#ntr#l Cr+ut W r n!4

3(2;(1 In\*t"ll +#ntr#l + r+u t\* n "++#r8"n+e 2 t) NF ' A 7\$ "n8 "\*" n8 +"te8(  
' r#, 8e nu . 9er #/ +#n8u+t#r\* "\*" re+#. . en8e8 93 \*3\*te .  
. "nu/" +turer t# &r#, 8e +#ntr#l /un+t #n\* n8 +"te8 #r \*e+ / e8(

3(; FIELD >UALITY CONTROL