TRENES ARGENTINOS
OPERACIONES

ADQUISICION DE FIBRA OPTICA MONOMODO LINEA BELGRANO SUR

Especificaciones Técnicas

1. ALCANCE

La necesidad del presente documento consiste en proporcionar los detalles técnicos que se requieren para la compra de 18.000 (diez y ocho mil) metros de fibra óptica para el tendido entre estaciones Tapiales y Gonzalez Catán de la Línea Belgrano Sur, estos deberán estar fraccionados en bobinas de 2.000 (dos mil) metros.

2. ESPECIFICACIONES TECNICAS:

Cable de Fibra óptica SM (Monomodo) 9/125, tipo anti roedor metálico con dos guías internas de metal.
Loose tuve de 12 F.O. código de colores internacional.
Cobertura exterior LSZH.
La óptica, geometría, performance mecánica y ambiental de la fibra óptica deberán cumplir con las tablas 1,2,3,4 y 5 debajo, según normas de la unión Internacional de Telecomunicaciones.

Table 1. Performance of The Single Mode Fiber (ITU-T G. 652 D)

ITEMS	UNITS	SPECIFICATION
Attenuation	dB/km	≤ 0.36 at 1310nm ≤ 0.36 at 1383nm[1)] ≤ 0.22 at 1550nm ≤ 0.25 at 1625nm
Chromatic Dispersion	ps/nm.km	≤ 3.5 at 1285nm ~ 1330nm ≤ 18 at 1550nm
Zero Dispersion Wavelength	nm	1300 ~ 1324
Zero Dispersion Slope	$ps/nm^2.km$	≤ 0.092
Polarization Mode Dispersion(PMD_Q)	$ps/(km)^{1/2}$	≤ 0.2 (20 section link)
Cut-off Wavelength (λcc, Cabled fiber)	nm	≤ 1260
Attenuation vs. Bending (60mm dia. x 100turns)	dB	≤ 0.1 at 1550nm
Mode Field Diameter	μm	9.2 ± 0.5 at 1310nm 10.4 ± 0.8 at 1550nm
Core-Clad Concentricity Error	μm	≤ 0.6
Cladding Diameter	μm	125 ± 1
Cladding Non-circularity	%	≤ 1
Coating Diameter	μm	240 ± 15
Proof Test Level	Gpa	≥ 0.69

Note [1)] The sampled attenuation average at this wavelength shall be less than or equal to the value specified at 1310 nm after hydrogen ageing according to IEC 60793-2-50 regarding the B1.3 fiber category

* Other performance value available upon request.

Table 2. Performance of The Single Mode Fiber (ITU-T G. 655 D)

ITEMS	UNITS	SPECIFICATION
Attenuation	dB/km	≤ 0.24 at 1550nm ≤ 0.26 at 1625nm
Chromatic Dispersion	ps/nm.km	≤ 6 at 1550nm ≤ 12 at 1625nm
Polarization Mode Dispersion(PMD_Q)	$ps/(km)^{1/2}$	≤ 0.2 (20 section link)
Cut-off Wavelength (λcc. Cabled fiber)	nm	≤ 1450
Attenuation vs. Bending (60mm dia. x 100turns)	dB	≤ 0.1 at 1625nm
Mode Field Diameter	μm	9.6 ± 0.5 at 1550nm
Core-Clad Concentricity Error	μm	≤ 0.6
Cladding Diameter	μm	125 ± 1
Cladding Non-circularity	%	≤ 1
Coating Diameter	μm	245 ± 10
Proof Test Level	Gpa	≥ 0.69

* Other performance value available upon request.

Table 3. Performance of the Conventional Multi Mode Fiber

ITEMS	UNITS	SPECIFICATION	
		50 Multi Mode	62.5 Multi Mode
Attenuation	dB/km	≤ 3.0 at 850nm ≤ 1.0 at 1300nm	≤ 3.5 at 850nm ≤ 1.0 at 1300nm
Bandwidth	MHz.km	≥ 500 at 850nm ≥ 500 at 1300nm	≥ 200 at 850nm ≥ 500 at 1300nm
Numerical Aperture	-	0.20±0.015	0.275±0.015
Core Diameter	μm	50±3.0	62.5±3.0
Core Non-circularity	%	≤ 6.0	≤ 6.0
Cladding Diameter	μm	125±2.0	125±2.0
Cladding Non-circularity	%	≤ 2.0	≤ 2.0
Core/Cladding Concentricity Error	μm	≤ 3.0	≤ 3.0
Coating Diameter	μm	245±15	245±15
Proof Test	kPsi	≥ 100	≥ 100

* Other performance value available upon request.

Table 4. Performance of the 1GbE Multi Mode Fiber

ITEMS	UNITS	SPECIFICATION	
		50 Multi Mode	62.5 Multi Mode
Attenuation	dB/km	≤ 3.0 at 850nm ≤ 1.0 at 1300nm	≤ 3.5 at 850nm ≤ 1.0 at 1300nm
1 Gigabit Ethernet Maximum Link Distance	m	≥ 500 at 850nm ≥ 500 at 1300nm	≥ 200 at 850nm ≥ 500 at 1300nm
Bandwidth	MHz.km	≥ 500 at 850nm ≥ 500 at 1300nm	≥ 200 at 850nm ≥ 500 at 1300nm
Numerical Aperture	-	0.20 ± 0.015	0.275 ± 0.015
Core Diameter	μm	50 ± 3.0	62.5 ± 3.0
Core Non-circularity	%	≤ 6.0	≤ 6.0
Cladding Diameter	μm	125 ± 2.0	125 ± 2.0
Cladding Non-circularity	%	≤ 2.0	≤ 2.0
Core/Cladding Concentricity Error	μm	≤ 3.0	≤ 3.0
Coating Diameter	μm	245 ± 15	245 ± 15
Proof Test	kpsi	≥ 100	≥ 100

* Other performance value available upon request.

Table 5. Performance of the OM3 Fiber

ITEMS	UNITS	SPECIFICATION
		OM 3
Attenuation	dB/km	≤ 3.0 at 850nm ≤ 1.0 at 1300nm
Bandwidth (Overfilled Launch LED based sources)	MHz.km	≥ 1500 at 850nm ≥ 500 at 1300nm
Transmission Link Length for 10Gbps	m	≥ 300 at 850nm
Numerical Aperture	-	0.20 ± 0.015
Core Diameter	μm	50 ± 3.0
Core Non-circularity	%	≤ 6.0
Cladding Diameter	μm	125 ± 2.0
Cladding Non-circularity	%	≤ 2.0
Core/Cladding Concentricity Error	μm	≤ 3.0
Coating Diameter	μm	245 ± 15
Proof Test	kpsi	≥ 100

* Other performance value available upon request.

Table 6. Performance of the Enhanced OM3 E Fiber

ITEMS	UNITS	SPECIFICATION
		OM 3E
Attenuation	dB/km	≤3.0 at 850nm ≤1.0 at 1300nm
Bandwidth (Overfilled Launch LED based sources)	MHz.km	≥3500 at 850nm ≥500 at 1300nm
Transmission Link Length for 10Gbps	m	≥550 at 850nm
Numerical Aperture	-	0.20±0.015
Core Diameter	㎛	50±3.0
Core Non-circularity	%	≤6.0
Cladding Diameter	㎛	125±2.0
Cladding Non-circularity	%	≤2.0
Core/Cladding Concentricity Error	㎛	≤3.0
Coating Diameter	㎛	245±15
Proof Test	kpsi	≥100

* Other performance value available upon request.

La construcción del cable deberá cumplir con las especificaciones de la tabla 7 que se describe a continuación.

Table 7. Construction of the Cable

ITEMS		DESCRIPTION		
Product Categories		S-100	S-200	S-400
Number of Fibers		Up to 288		
No. of Fibers per Tube		Up to 6 or 12		
Loose Buffer Tube		PBT (Polybutylene Terephthalate)		
Filling Compound in Loose Buffer Tube		Thixotropic Jelly Compound		
Filler		Polyethylene rod (if necessary)		
Central Strength Member		FRP (Fiber Reinforced Plastic)		
Water Blocking Material		Water Blocking Yarn		
Core Wrapping Tape		Water Blocking Tape		
Ripcord		N.A.	One Ripcord	
Inner Jacket	Material	Black PE		
	Thickness	N.A.	Nominal 1.0mm	Nominal 1.0mm
Peripheral strength element		Aramid yarns		
Ripcord		One ripcord		
Outer Jacket	Material	Black PE or Anti-Tracking PE*		
	Thickness	Nominal 1.8mm	Nominal 1.5mm	Nominal 1.5mm

* Space Potential
- Less than 12kV : Black PE
- 12 ~ 25kV : Anti-Tracking PE

El código de color del loose buffer tubes y las fibras individuales dentro de cada tubo de loose buffer deberá cumplir con las tablas 8 y 9 debajo.

Table 8. Color code of the individual fibers

No. of Fibers	Color	No. of Fibers	Color
1	Blue	7	Red
2	Orange	8	Black
3	Green	9	Yellow
4	Brown	10	Violet
5	Slate	11	Rose
6	White	12	Aqua

Table 9. Color Code of the Loose Buffer Tubes

No. of Loose Buffer Tubes	Color	No. of Loose Buffer Tubes	Color
1	Blue	13	Blue / BK*
2	Orange	14	Orange / BK
3	Green	15	Green / BK
4	Brown	16	Brown / BK
5	Slate	17	Slate / BK
6	White	18	White / BK
7	Red	19	Red / BK
8	Black	20	Black / WH**
9	Yellow	21	Yellow / BK
10	Violet	22	Violet / BK
11	Rose	23	Rose / BK
12	Aqua	24	Aqua / BK

*BK: Black Stripe / **WH: White Stripe

La performance mecánica y ambiental del cable deberá cumplir con la tabla 10 debajo. Salvo que se especifique, las medidas de atenuación en esta sección deberán realizarse a 1550nm para SMF (single mode fiber) y 1300nm para MMF (multi mode fiber).

Table 10. The Mechanical and Environmental Performance of the Cable

ITEMS	TEST METHOD AND ACCEPTANCE CRITERIA
Tensile Strength	# Test method: IEC 60794-1-2 Method E1 -. Mandrel diameter: 30D (D = cable diameter) -. Length under tension: ≥ 50 m -. Tensile load: 2,700N for 1 hour # Acceptance Criteria -. Attenuation increment: ≤ 0.1 dB for SMF ≤ 0.2 dB for MMF -. No jacket cracking and fiber breakage
Crush resistance	# Test method: IEC 60794-1-2 Method E3 -. Applied load: 2000 N/100 mm -. No of points. 1 point # Acceptance Criteria -. Attenuation Increment: ≤ 0.1 dB for SMF ≤ 0.2 dB for MMF after the test -. No jacket cracking and fiber breakage
Impact resistance	# Test method: IEC 60794-1 Method E4 -. Impact Energy: 10J -. No. of impact per point: 1 time -. No. of impact points: 3 points (500mm interval) # Acceptance Criteria -. Attenuation Increment : ≤ 0.1 dB for SMF ≤ 0.2 dB for MMF after the test -. No jacket cracking and fiber breakage
Flexibility Test	# Test method: IEC 60794-1-2 Method E6 -. Sheave diameter: 20D (D = cable diameter) -. Flexing speed: Minimum 12 cycles/minute -. Applied mass: 3kg -. No. of flexing cycles: 25 cycles # Acceptance Criteria -. Attenuation Increment: ≤ 0.1 dB for SMF ≤ 0.2 dB for MMF after the test -. No jacket cracking and fiber breakage

Continúa del anterior.

Cable Bend	# Test method: IEC 60794-1-2 Method E11A -. Bending radius(mandrel): 20D (D = cable diameter) -. No. of turns: 4 turns(wrapped and unwrapped) -. No. of flexing cycles: 10 cycles # Acceptance Criteria -. Attenuation Increment: ≤ 0.1 dB for SMF ≤ 0.2 dB for MMF after the test -. No jacket cracking and fiber breakage
Cable Twist Test	# Test method: IEC 60794-1-2 Method E7 -. Cable length under test: 2m -. No. of twist cycles: 10 cycles -. Twist angle: ± 180° # Acceptance Criteria -. Attenuation Increment: ≤ 0.1 dB for SMF ≤ 0.2 dB for MMF after the test -. No jacket cracking and fiber breakage
Temperature Cycling	# Test method: IEC 60794-1 Method F1 -. Temperature cycling schedule : 23℃ → -40℃ → 70℃ → -40℃ → 70℃ → 23℃ -. Soak time at each temperature: 24hours # Acceptance Criteria -. Attenuation increment: ≤ 0.1 dB/km for SMF ≤ 0.2 dB/km for MMF
Water Penetration	# Test method: IEC 60794-1-2 Method F5 -. Length of specimen: 3m * Outer jacket and aramid yarns shall be removed before the test. (Double Jacket Only) -. Height of pressure head: 1m -. Test time: 24 hours # Acceptance Criteria -. No leakage through the open cable end

Embalaje y marcado

Marcado de cable:

La vaina se marcará con caracteres blancos a intervalos de un metro con mínimamente la siguiente información:

1) Tipo de cable (ej:, "ADSS S-100M")
2) Tipo de fibra y recuento (ej, " SM24C")
3) Nombre del fabricante (" GLC.TEC")
4) Año de fabricación
5) Longitud

Re-marcado del cable:

La nueva marcación se marcará, preferiblemente con caracteres amarillos, en la vaina exterior.

Embalaje del cable:

Se solicita que la longitud de las bobinas sea de 2000 metros.

Cada longitud del cable se enrollará en un carrete de madera separado.

Ambos extremos del cable se deberán sellar con tapas de plástico adecuadas para evitar la entrada de Humedad durante el envío, manipulación y almacenamiento.

Los extremos del cable deberán estar bien sujetos al carrete para evitar que el cable se suelte durante las operaciones de colocación.

Los listones de circunferencia o el tablero de fibra de madera se asegurarán con bandas de acero para proteger el cable durante el manejo y el envío.

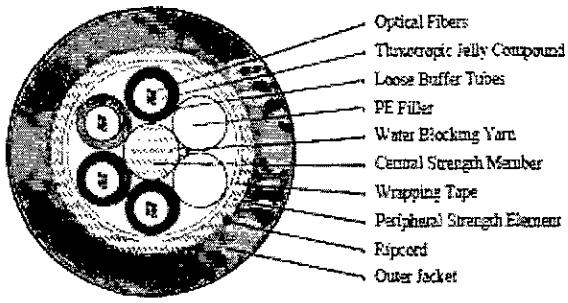
Carrete de cable (bobina):
Mínimamente los siguientes detalles deberán ser marcados con materiales resistentes a la intemperie en ambos lados del carrete (bobina):

1) Tipo de cable y recuento de fibras
2) Longitud del cable en metro
3) Peso bruto en kilogramos
4) Número de rollo
5) Nombre del fabricante
6) Año de fabricación
7) País de origen
8) Flecha que muestra la dirección en que debe rodarse el tambor

Seguridad
Directiva RDHS
Todos los cables y los materiales de empaquetado y etiquetados asociados, deberán cumplir con las directivas RDHS (Restricción de la Utilización de Ciertas Sustancias Peligrosas) según corresponda.
Directiva ISPM 15
Todos los materiales de embalaje de madera deberán cumplir con la NIMF (Normas Internacionales de Fitosanidad Medidas) según corresponda.

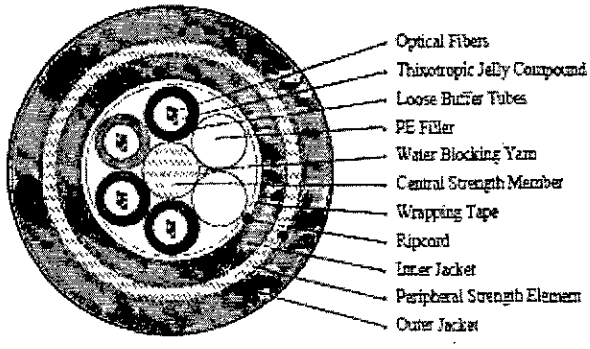
< Dibujo de Corte seccional del cable >

1. S-100



*The drawing appearing on this page may be subject to change or modification without any prior notice

2. S-200, 400



Diámetro, composición y peso

Cable Type	Fiber Counts	Cable Diameter (mm)	Approx. Cable Weight (kg/km)	Minimum Bending Radius (mm)	
				Under Load	No Load
S-100	2 – 36	11.3±0.5	96	226	113
	38 – 72	11.3±0.5	98	226	113
	74 – 96	12.8±0.5	126	256	128
	98 – 120	14.3±0.5	155	286	143
	122 – 144	15.8±0.5	188	316	158
	146 – 288	18.5±0.5	258	370	185
S-200	2 – 36	13.0±0.5	127	260	130
	38 – 72	13.3±0.5	133	266	133
	74 – 96	14.7±0.5	163	294	147
	98 – 120	16.1±0.5	197	322	161
	122 – 144	17.5±0.5	232	350	175
	146 – 288	20.4±0.5	315	408	204
S-400	2 – 36	13.7±0.5	142	274	137
	38 – 72	14.3±0.5	155	286	143
	74 – 96	15.6±0.5	186	312	156
	98 – 120	16.9±0.5	222	338	169
	122 – 144	18.3±0.5	255	366	183
	146 – 288	21.5±0.5	348	430	215

SAG, información de tensión

G-100

Fiber count	Installation Parameters			NESC Loading condition					
				Light		Medium		Heavy	
	span(m)	sag(%)	tension(kgf)	sag(%)	tension(kgf)	sag(%)	tension(kgf)	sag(%)	tension(kgf)
2 ~ 36	40	1.0	48	0.6	98	2.2	134	3.3	201
	60	1.0	72	0.6	137	2.5	193	3.6	270
	80	1.0	96	0.6	173	2.6	238	4.0	339
	100	1.0	120	0.7	209	2.8	270		
	120	1.0	144	0.7	241	2.9	310		
	140	1.0	168	0.7	273				
	160	1.0	192	0.7	306				
38 ~ 72	40	1.0	49	0.6	100	2.2	136	3.2	206
	60	1.0	74	0.6	140	2.4	186	3.6	277
	80	1.0	98	0.6	177	2.6	253		
	100	1.0	123	0.7	213	2.7	276		
	120	1.0	147	0.7	246				
	140	1.0	172	0.7	280				
74 ~ 96	40	1.0	64	0.6	116	2.2	164	3.0	231
	60	1.0	96	0.7	164	2.3	215	3.4	312
	80	1.0	127	0.7	209	2.6	267		
	100	1.0	159	0.7	252	2.6	319		
	120	1.0	191	0.7	293				
	140	1.0	223	0.8	333				
98 ~ 120	40	1.0	78	0.7	131	2.2	167	3.0	246
	60	1.0	117	0.7	184	2.4	231	3.4	332
	80	1.0	156	0.7	236	2.6	291		
	100	1.0	196	0.8	284	2.6	347		
	120	1.0	234	0.8	332				
	140	1.0	273	0.8	378				
122 ~ 144	40	1.0	96	0.7	146	2.2	182	3.0	262
	60	1.0	142	0.8	207	2.4	262	3.4	364
	80	1.0	189	0.8	266	2.6	317		
	100	1.0	236	0.8	321	2.6	380		
	120	1.0	284	0.8	376				
146 ~ 228	40	1.0	108	0.7	168	2.1	196	2.9	281
	60	1.0	166	0.8	226	2.3	278	3.2	382
	80	1.0	211	0.8	289	2.4	346		
	100	1.0	264	0.8	351	2.6	416		
	120	1.0	317	0.8	412				

S-200

Fiber count	Installation Parameters			NESC Loading condition					
				Light		Medium		Heavy	
	span(m)	sag(%)	tension(kgf)	sag(%)	tension(kgf)	sag(%)	tension(kgf)	sag(%)	tension(kgf)
2 - 36	100	1.0	160	0.7	286	2.5	340	3.6	495
	120	1.0	192	0.7	310	2.6	393	3.7	567
	140	1.0	224	0.7	353	2.6	444	3.9	635
	160	1.0	256	0.7	395	2.7	493		
	180	1.0	288	0.7	436	2.8	541		
	200	1.0	320	0.8	476	2.9	588		
	220	1.0	352	0.8	516				
	240	1.0	384	0.8	555				
	260	1.0	416	0.8	594				
38 - 72	100	1.0	168	0.7	281	2.4	362	3.4	533
	120	1.0	201	0.7	329	2.4	419	3.5	612
	140	1.0	235	0.7	375	2.5	474	3.6	688
	160	1.0	268	0.7	420	2.6	528		
	180	1.0	302	0.7	464	2.7	580		
	200	1.0	335	0.7	508	2.7	631		
	220	1.0	369	0.8	550				
	240	1.0	402	0.8	593				
	260	1.0	436	0.8	634				
74 - 96	100	1.0	208	0.7	319	2.3	399	3.3	580
	120	1.0	249	0.7	374	2.4	464	3.4	667
	140	1.0	291	0.8	427	2.5	526	3.5	750
	160	1.0	332	0.8	479	2.5	587		
	180	1.0	374	0.8	531	2.6	646		
	200	1.0	415	0.8	582	2.7	704		
	220	1.0	457	0.8	632				
	240	1.0	498	0.8	681				
	260	1.0	540	0.8	730				
98 - 120	100	1.0	248	0.8	354	2.3	432	3.3	615
	120	1.0	297	0.8	415	2.4	502	3.4	708
	140	1.0	347	0.8	475	2.5	570		
	160	1.0	396	0.8	534	2.5	637		
	180	1.0	446	0.8	593	2.6	702		
	200	1.0	495	0.8	650	2.6	766		
	220	1.0	545	0.8	707				
122 - 144	100	1.0	291	0.8	392	2.3	488	3.2	653
	120	1.0	350	0.8	461	2.4	545	3.4	752
	140	1.0	408	0.8	529	2.5	620	3.5	847
	160	1.0	466	0.9	596	2.5	693		
	180	1.0	524	0.9	661	2.6	765		
	200	1.0	583	0.9	726	2.6	836		
	220	1.0	641	0.9	791				
146 - 288	100	1.0	395	0.9	486	2.3	568	3	779
	120	1.0	474	0.9	574	2.3	683	3.1	902
	140	1.0	553	0.9	662	2.4	758	3.2	1020
	160	1.0	632	0.9	748	2.4	852		
	180	1.0	711	0.9	834	2.4	944		
	200	1.0	790	0.9	919	2.5	1035		
	220	1.0	869	0.9	1003				

S-400

Fiber count	Installation Parameters			NESC Loading condition					
				Light		Medium		Heavy	
	span(m)	sag(%)	tension(kgf)	sag(%)	tension(kgf)	sag(%)	tension(kgf)	sag(%)	tension(kgf)
2 – 36	200	1.0	355	0.7	549	2.5	688	3.7	885
	220	1.0	391	0.7	586	2.6	744	3.7	1070
	240	1.0	426	0.7	640	2.6	786	3.8	1143
	260	1.0	462	0.8	668	2.7	852	3.8	1215
	280	1.0	497	0.8	733	2.7	906		
	300	1.0	533	0.8	778	2.7	957		
	320	1.0	569	0.8	822	2.8	1008		
	340	1.0	604	0.8	866	2.8	1059		
	360	1.0	639	0.8	910	2.8	1109		
	380	1.0	675	0.8	953	2.9	1159		
	400	1.0	710	0.8	996	2.9	1206		
	420	1.0	746	0.8	1038				
	440	1.0	781	0.8	1081				
	480	1.0	817	0.8	1123				
	460	1.0	852	0.8	1165				
38 – 72	200	1.0	380	0.7	599	2.4	752	3.4	1100
	220	1.0	429	0.7	651	2.5	814	3.5	1184
	240	1.0	466	0.7	702	2.5	875	3.5	1266
	260	1.0	507	0.8	753	2.5	935	3.6	1347
	280	1.0	546	0.8	804	2.6	994		
	300	1.0	585	0.8	854	2.6	1052		
	320	1.0	624	0.8	903	2.6	1109		
	340	1.0	663	0.8	952	2.7	1166		
	360	1.0	702	0.8	1000	2.7	1222		
	380	1.0	741	0.8	1049	2.7	1278		
	400	1.0	780	0.8	1096	2.7	1333		
	420	1.0	819	0.8	1144				
	440	1.0	856	0.8	1191				
	460	1.0	897	0.8	1238				
	480	1.0	936	0.8	1285				
	500	1.0	975	0.8	1331				
74 – 96	200	1.0	466	0.8	666	2.4	816	3.3	1174
	220	1.0	514	0.8	726	2.4	864	3.4	1265
	240	1.0	561	0.8	793	2.5	952	3.5	1354
	260	1.0	606	0.8	846	2.5	1016	3.5	1441
	280	1.0	655	0.8	897	2.5	1083		
	300	1.0	701	0.8	954	2.6	1147		
	320	1.0	748	0.8	1010	2.6	1211		
	340	1.0	795	0.8	1065	2.6	1274		
	360	1.0	842	0.8	1121	2.7	1336		
	390	1.0	886	0.8	1175	2.7	1398		
	400	1.0	935	0.8	1230	2.7	1459		
	420	1.0	982	0.8	1284				
	440	1.0	1029	0.9	1338				
	460	1.0	1075	0.9	1392				
96 – 120	200	1.0	555	0.8	739	2.4	887	3.3	1256
	220	1.0	611	0.8	805	2.4	962	3.4	1353
	240	1.0	666	0.8	870	2.5	1036	3.4	1449
	260	1.0	722	0.8	935	2.5	1110	3.5	1544
	280	1.0	777	0.9	1000	2.5	1182		
	300	1.0	833	0.9	1064	2.5	1253		
	320	1.0	888	0.9	1127	2.6	1324		
	340	1.0	944	0.9	1190	2.6	1394		
	360	1.0	999	0.9	1253	2.6	1463		
	380	1.0	1055	0.9	1315	2.6	1532		
	400	1.0	1110	0.9	1377				
	420	1.0	1166	0.9	1439				
	440	1.0	1221	0.9	1501				
122 – 144	200	1.0	643	0.9	812	2.4	955	3.3	1336
	220	1.0	707	0.9	885	2.4	1037	3.4	1431
	240	1.0	771	0.9	958	2.5	1118	3.4	1533
	260	1.0	835	0.9	1031	2.5	1197	3.5	1634
	280	1.0	900	0.9	1103	2.5	1276		
	300	1.0	964	0.9	1174	2.5	1355		
	320	1.0	1026	0.9	1245	2.6	1432		
	340	1.0	1092	0.9	1316	2.6	1509		
	360	1.0	1157	0.9	1386	2.6	1585		
	380	1.0	1221	0.9	1456	2.6	1661		
	400	1.0	1285	0.9	1526				
	420	1.0	1349	0.9	1595				
146 – 288	200	1.0	875	0.9	1014	2.3	1167	3.1	1601
	220	1.0	963	0.9	1110	2.3	1271	3.1	1732
	240	1.0	1050	0.9	1205	2.3	1376	3.2	1881
	260	1.0	1139	0.9	1300	2.4	1477	3.2	1987
	280	1.0	1226	0.9	1393	2.4	1578	3.3	2112
	300	1.0	1313	0.9	1488	2.4	1679		
	320	1.0	1400	1.0	1579	2.4	1779		
	340	1.0	1488	1.0	1672	2.4	1878		
	360	1.0	1575	1.0	1765	2.4	1977		
	380	1.0	1663	1.0	1857	2.5	2075		
	400	1.0	1750	1.0	1949	2.5	2173		
	420	1.0	1838	1.0	2041				
	440	1.0	1925	1.0	2132				

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