



CITY AND COUNTY OF SAN FRANCISCO  
San Francisco Municipal Transportation Agency  
Request for Proposals  
THE PROCUREMENT OF  
30-Foot, 40-FOOT AND 60-FOOT LOW FLOOR  
DIESEL HYBRID COACHES

Proposal Section	Title	Bid Submission Requirements
7	TECHNICAL PROPOSAL WORKSHEET	The Technical Proposal Worksheet, Follow-up Service Worksheet, and Delivery Schedule Worksheet included in Appendix B-Volume 1 RFP shall be completed in their entirety.

Please refer to the Technical Proposal sheets attached for XDE40, XDE35 and XDE60 buses with the BAE and Allison propulsion system.  
Delivery schedule worksheets is part of Section 6-B as instructed in the RFP.



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XDE35 BAE

**1A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
30-FT LOW FLOOR DIESEL HYBRID COACHES**

Bus Manufacturer: New Flyer of America Inc.

Bus Model Number: XDE35

**1. Dimensions**

A. Overall Length

- i. Over Bumpers      36 Feet      3 Inches
- ii. Over Body          35 Feet      5 Inches

B. Overall Width

- i. Over Body excluding mirrors and lights      102 Inches
- ii. Over body including mirrors                      132 Inches
- iii. Over tires    102 Inches

C. Overall Height

- i. Excluding Roof-Mounted H&V System      126 Inches
- ii. Including Roof-Mounted H&V System      130 Inches

D. Angle of Approach

9.0 +/-0.5 Degrees

E. Angle of Departure

9.0 +/-0.5 Degrees

F. Breakover Angle

12.0 +/-0.5 Degrees

G. Doorway Clear Opening **With Grab Handles** **No Grab Handles**

	<b>Width</b>	<b>Width</b>	<b>Height</b>
i. Front Door	<u>33.8</u> In.	<u>36.8</u> In.	<u>77.0</u> In.
ii. Rear Door	<u>40.9</u> In.	<u>45.2</u> In.	<u>77.3</u> In.

K. Interior Head Room (center of aisle)

- i. First Axle Location                              79.5 Inches
- ii. Drive Axle Location                              78 Inches

L. Aisle Width

- i. Minimum Width on Floor Between First Axle Wheel Housings      35.5 Inches
- ii. Minimum Width on Floor Between Second Axle Wheel Housings      41.5 Inches

**1A. TECHNICAL PROPOSAL WORKSHEET  
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iii. Minimum Aisle Width Between Longitudinal Seats		<u>30.6</u> Inches
iv. Minimum Aisle Width Between Transverse Seats		<u>21.75</u> Inches
M. Minimum Ground Clearance		
i. Excluding Axles		<u>10.0</u> Inches
ii. At Axles		<u>5.6</u> Inches
N. Turning Envelope		
i. Outside Body Corner Turning Radius Including Bumper		<u>468</u> Inches
ii. Inside Turning Radius		<u>252</u> Inches
O. Wheel Base		
i. First axle to Drive axle		<u>226.75</u> Inches
P. Track		
i. First axle measured center of tire to center of tire		<u>87.5</u> Inches
ii. Drive axle measured center of dual tires to center of dual tires		<u>75</u> Inches
Q. Overhang, Centerline of Axle Over Bumper		
i. Front		<u>87.3</u> Inches
ii. Rear		<u>120.8</u> Inches
R. Floor		
i. Interior Length	<u>29</u> Feet	<u>7.5</u> Inches
ii. Interior Width	<u>8</u> Feet	<u>0</u> Inches
iii. Height of floor from ground level at front doors		<u>15.5</u> Inches
iv. Height of floor from ground level at back doors		<u>15.5</u> Inches
S. Capacity		
i. Total Number of Passenger Seats		<u>26</u>
ii. Total Number of Standing Passengers		<u>34</u>



Procurement of 30-ft, 40-ft and 60-ft Low Floor Diesel Hybrid Coaches

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<b>2. Bus Weight</b>	<b>Curb Weight</b>	<b>Curb Weight plus Seated Load</b>	<b>Curb Weight plus Gross Load (GVWR)</b>
A. First Axle	<u>8,460</u> lbs.	<u>9,121</u> lbs.	<u>11,628</u> lbs.
B. Drive Axle	<u>20,000</u> lbs.	<u>23,389</u> lbs.	<u>25,982</u> lbs.
C. Total	<u>28,460</u> lbs.	<u>32,510</u> lbs.	<u>37,610</u> lbs.

**3. Bicycle Rack Provision**

- A. Manufacturer Sportworks
- B. Model TSB quick Release

**4. Paint**

- A. Manufacturer Axalta
- B. Type Imron Elite

**5. Windshield Wipers and Washer**

- A. Manufacturer
- B. Type Electric
- C. Reservoir Capacity 5 gal.

**6. Bumpers**

- A. Manufacturer Romeo Rim
- B. Type 3 piece HELP

**7. Floor**

- A. Subfloor
  - i. Material Thermo-Lite Board Series 2862
  - ii. Thickness 0.750 in.
- B. Floor Covering
  - i. Manufacturer Altro
  - ii. Thickness 2.7mm / 0.11"

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**8. Windows**

A. Passenger Windows

- i. Manufacturer Arow Global (Stormtite)
- ii. Number of Windows 10 (including Driver's window)
- iii. Dimensions of Windows 42.12 in. (width) x 42.60 in. (height)  
62.28 in. (width) x 42.60 in. (height)  
62.28 in. (width) x 35.12 in. (height)
- iv. Total Window area (Street side) 13,800 sq. in.
- v. Total Window area (Curb side) 9,500 sq. in.

B. Rear Window

- i. Dimensions of Windows N/A in. (width) x N/A in. (height)

**9. Door System**

- A. Manufacturer Vapor
- B. Model
  - i. Front door Slide Glide
  - ii. Rear door Slide Glide Activair
- C. Open/Close Mechanism (air, electric, spring, other)
  - i. Front door air
  - ii. Rear door air

**10. Exterior Lighting**

- A. LED Lights Manufacturer J.W Speaker (headlights) & Dialight
- B. Deceleration Lighting System  
Manufacturer and Model Number Dialight

**11. Interior Lights**

- A. Manufacturer TCB
- B. Type LED
- C. Model Number LED
- D. Number of Fixtures 8
- E. Size of Fixtures 72 to 96 inches
- F. Power Supplies (Ballasts) Not Applicable to LED

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**12. Heating and Ventilating Equipment**

- A. Heating System Capacity 105,000 B.T.U.
- B. Ventilating Capacity 2400 total cfm per passenger
- C. Heater Cores
  - i. Manufacturer & Model Thermo King
  - ii. Number of Rows 2
  - iii. Number of Fins per Inch 9
  - iv. Outer Diameter of Tube 0.375 In.
  - v. Fin Thickness 0.008 In.
  - vi. Number of Heater Cores 1
- D. Heater Blowers
  - i. Manufacturer & Model N/A
  - ii. Horsepower N/A
  - iii. Speed(s) N/A
  - iv. Capacity N/A cfm
- E. Controls
  - i. Manufacturer Thermo King
  - ii. Type Microprocessor
  - iii. Model Number IntelligAIRE III
- F. Heating Equipment Location 0 Above Engine Compt. 1 Roof  
0 Under Floor 0 Other (describe)

**13. Wheelchair Ramp Equipment**

- A. Manufacturer New Flyer
- B. Type Flip-out
- C. Model Number Gen II
- D. Capacity 660 lbs.
- E. Dimensions
  - i. Width of Ramp 32.0 In.
  - ii. Length of Ramp 47.5 In.

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F. Cycle Times	<b>Normal Idle</b>	<b>Fast Idle</b>
i. Stowed to Ground	<u>10</u> Sec.	<u>10</u> Sec.
ii. Ground to Stow	<u>10</u> Sec.	<u>10</u> Sec.
iii. Total Cycle	<u>20</u> Sec.	<u>20</u> Sec.
G. Weight of Complete Ramp	<u>130</u> lbs.	

**14. Passenger Seat**

A. Manufacturer	<u>American Seating 6468</u>
B. Type	<u>Cantilever/Pedestal</u>
C. Seat Material	<u>Stainless Steel</u>
D. Seat Insert Material	<u>Fiberglass</u>
E. Minimum Hip-to-Knee Room	<u>27</u> in.
F. Minimum Foot Room	<u>10.5</u> in

**15. Destination Signs**

A. Manufacturer		
B. Size	<b>Rows</b>	<b>Columns</b>
i. Front Destination Sign	<u>16</u>	<u>112</u>
ii. Curb Side Destination Sign	<u>9</u>	<u>72</u>
iv. Rear Destination Sign	<u>14</u>	<u>108</u>
v. Dash Mount Run Number Sign	<u>14</u>	<u>40</u>

**16. Voice Annunciation System**

A. Manufacturer	<u>Digital Recorders Inc.</u>
B. Model Number	<u>DR600</u>

**17. Public Address System**

A. Microphone Manufacturer and Model		<u>Digital Recorders / AGC &amp; Sleath</u>
B. Amplifier Manufacturer and Model		<u>DRI Stealth MIC processor Type 1</u>
C. Number of Speaker(s)	<b>Inside</b>	<b>Outside</b>
	<u>6</u>	<u>1</u>

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**18. Surveillance Camera System**

- A. Manufacturer Kratos
- B. Number of Cameras 10
- C. Digital Disk Storage Capacity 72 hr. minimum

**19. Automatic Passenger Counter**

- A. Manufacturer UTA
- B. Model Number Smart Sensor

**20. Driver's Area**

- A. Steering Wheel
  - i. Manufacturer Vehicle Improvement Products
  - ii. Model Number BKBL1824D4V
  - iii. Size 18.00 diameter
- B. Operator's Seat
  - i. Manufacturer USSC
  - ii. Model Number 9100
- C. Driver Heater/Defroster
  - i. Manufacturer Mobile Climate Control
  - ii. Type 24 V Litton Motor
  - iii. Model Number 12-60020
  - iv. Capacity 84,000 B.T.U.
  - v. Blower Speed(s) 3 speeds
- D. Windshield
  - i. Dimensions (Length x Height) 49(per side) in. x 42 in.
  - ii. Number of Sections 2
  - iii. Material Laminate glass
  - iv. Thickness 0.232 to 0.260 Inches

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E. Driver's Side Window

- i. Dimensions (Length x Height) 42.16 in. x 41.78 in.
- ii. Number of Sections 2
- iii. Material Laminated Glass
- iv. Thickness 6 mm

F. Side Mirrors

	<b>Curb Side</b>	<b>Street Side</b>
i. Manufacturer(s)	<u>Lucerix</u>	<u>Lucerix</u>
ii. Model Number(s)	<u>32.602.00-01-12V</u>	<u>31.757.00-01-12V</u>

G. Storage Locker

- i. Number of Lockers 2
- ii. Size 10.5 + 11.7 Cu. Ft.
- iii. Location Above Driver and behind Driver's Seat

**21. Engine**

- A. Manufacturer Cummins
- B. Type 2013 Diesel
- C. Model Number ISB 6.7 280
- D. Number of Cylinders 6 (six)
- E. Bore 4.21 In.
- F. Stroke 4.88 In.
- G. Displacement Cu. 408 In.
- H. Compression Ratio 17.3:1
- I. Injector Size & Type Bosch Closed Nozzle
- J. Power 280 HP      209 ( kW)      2400 at rpm
- K. Peak Torque 660 lb. ft.      895 ( Nm)      1600 at rpm
- L. Engine Speed at **Idle**      **Fast Idle**      **Governed**  
700 rpm      900 rpm      2,800 rpm
- M. Dry Weight 1,150 lbs.
- N. Crankcase Oil Capacity
  - i. New Engine, Dry 3 Gals.

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- ii. New Engine, Wet 3 gals.
O. Turbo Charger
i. Manufacturer Holset
ii. Type HX40
iii. Maximum rpm, not at load 2,800 rpm
iv. Maximum rpm, at full load 2,400 rpm

22. Cooling System

- A. Radiator
i. Manufacturer EMP
ii. Type Aluminum Bar-Plate
iii. Model Number XPL1
iv. Core Area TBD in. x TBD in. = TBD in2
v. Number of Tubes 37rows (radiator) 15 rows (CAC)
vi. Tube Outer Diameter 0.098 major In.
vii. Fins per Inch 8.5
viii. Fin Thickness 0.003 In.
ix. Fin Construction Non-louvered wavy
B. Total Cooling System Capacity 23 gals.
C. Radiator Fan Speed Control Type Electronic
D. Surge Tank Capacity 5 gals
E. Surge Tank Material Stainless Steel
F. Engine Thermostat Temperature Settings Degrees 200 F
G. Overheat Alarm Temperature Sending Unit Settings Degrees 225 F
H. Maximum Ambient Operating Temperature Degree 235 F

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**23. Propulsion Generator**

- A. Manufacturer BAE
- B. Type In-line drive
- C. Size 6 in. x 23.6 in. x 23.6 in.
- D. Weight, Complete 804 lbs.
- E. Power Output 200 kW (268 hp) @ 2300rpm

**24. Traction Motor**

- A. Manufacturer BAE
- B. Type Series Hybrid Drive
- C. Model Number HDS200
- F. Oil Capacity (including heat exchanger) 3 gal.

**25. Energy Storage**

- A. Manufacturer BAE
- B. Type Nano-iron-phosphate
- C. Size 200 kW peak
- D. Weight, Complete 800 lbs.
- E. Power Output 635 Vdc nominal
- F. Cooling Requirement Ambient air-cooled

**26. Energy Storage Controller**

- A. Manufacturer BAE

**27. Propulsion Control System**

- A. Manufacturer BAE
- B. Cooling Media water ethylene/glycol (or propylene glycol)
- C. Cooling Requirements 15gpm (57 lpm)



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**28. Axle**

**A. First Axle**

- i. Manufacturer & Model Number MAN VOK-07-F
- ii. Type Reverse Elliot cast beam, dropped center, non-driven
- iii. Rating 15,873 lbs

**B. Drive Axle Ratio**

- i. Differential Ratio 4.56:1
- ii. Hub Reduction Ratio (if used) N/A
- iii. Final Axle Ratio (if hub reduction is used) 4.56:1

**29. Suspension**

**A. Air Bags**

- i. Manufacturer Firestone
- ii. Number of Air Bag per Wheel 2 Front 4 Rear
- iii. Total Air Bag Volume TBD Cu. In. TBD Cu. In.

**B. Shock Absorbers**

- i. Manufacturer Koni
- ii. Type double-acting, telescoping type
- iii. Number of Shock per Wheel 2 Front 4 Rear

**30. Brake System**

**A. Fundamental System Manufacturer**

Knorr

**B. First Axle Brake Actuator Model and Part Number**

MGM/ 1621705, 1621706

**C. Drive Axle Brake Actuator Model and Part Number**

MGM/ MJB2024ET752

**D. First Axle Brake Rotor**

- i. Manufacturer MAN
- ii. Part Number 81.50803.0040
- iii. Diameter 16.14

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iv. Width	<u>TBD In.</u>	
E. Drive Axle Brake Disc		
i. Manufacturer	<u>MAN</u>	
ii. Part Number	<u>81.50803.0041</u>	
iii. Diameter	<u>16.14 In.</u>	
iv. Width	<u>TBD In.</u>	
F. Brake Pad Manufacturer	<u>Ferodo</u>	
G. First Axle Brake Pad Identification		
i. Forward	<u>81.50820.5104</u>	
ii. Reverse	<u>81.50820.5104</u>	
H. Drive Axle Brake Pad Identification		
i. Forward	<u>81.50820.5104</u>	
ii. Reverse	<u>81.50820.5104</u>	
I. Brake Pads	<u>2 pads/caliper, 4 pads per axles</u>	
J. Brake Pad Size	<b>Length</b>	<b>Width</b>
i. First Axle	<u>7.09 In.</u>	<u>TBD In.</u>
ii. Drive Axle	<u>7.09 In.</u>	<u>TBD In.</u>
K. Pad Thickness	<u>0.827 In.</u>	
L. Pad Area per Wheel		
i. First Axle	<u>30.38 Sq. In.</u>	
ii. Drive Axle	<u>30.38 Sq. In.</u>	
M. Anti-Lock Brake System Manufacturer	<u>WABCO</u>	

**31. Air System**

A. Air Compressor		
i. Manufacturer	<u>Powerex</u>	
ii. Type	<u>Scroll</u>	
iii. Model Number	<u>SLAEOSE-HP</u>	
iv. Capacity at Idle	<u>13.5 cfm</u>	
v. Capacity at Maximum Speed	<u>13.5 cfm</u>	
vi. Maximum Warranted Speed	<u>TBD rpm</u>	

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- vii. Idle Speed TBD rpm
- viii. Drive Type Belt to electric motor
- B. Air Reservoir Capacity
  - i. Supply Reservoir 800 Cu. In.
  - ii. Primary Reservoir 1200 Cu. In.
  - iii. Secondary Reservoir 2000 Cu. In.
  - iv. Parking Reservoir 2000 Cu. In.
  - v. Accessory Reservoir 1400 Cu. In.
  - vi. Other Reservoir 2150 Cu. In.
- C. Air Dryer
  - i. Manufacturer Graham White
  - ii. Model Number SludgeBreaker QBA60NX5

**32. Fuel System**

- A. Fuel Tank
  - i. Manufacturer New Flyer
  - ii. Size 100 usable Gallons
  - iii. Material Cross-linked polyethylene
- B. Filler
  - i. Manufacturer EMCO Wheaten
  - ii. Model Number Posi-snap

**33. Hydraulic System**

- A. Fan Drive
  - i. Manufacturer N/A, electric Radiator
  - ii. Type N/A, electric Radiator
  - iii. Model Number N/A, electric Radiator
- B. Power Steering
  - i. Steering Gear Manufacturer Sheppard
  - ii. Type M110
  - iii. Relief Pressure 2175 psi
  - iv. Power Steering Fluid Capacity 20 qts.

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v. Effort at Steering Wheel  
(Unloaded stationary coach  
on dry asphalt pavement)

9 lbs. to 10 degrees

**34. Wheels**

- A. Manufacturer Accuride
- B. Type Aluminum
- C. Size 22.5" x 8.25"
- D. Mounting Hub Piloted

**35. Tires**

- A. Manufacturer Customer Supplied Firestone
- B. Type Low Profile
- C. Size 305/70R22.5
- D. Load Range Depends on tire manufacturer
- E. Inflation Pressure 1st Axle Depends on tire manufacturer p.s.i. Drive Axle Depends on tire manufacturer p.s.i.

**36. Starter**

- A. Manufacturer N/A
- B. Model Number N/A
- C. Tank volume N/A

**37. Fire Detection/Suppression System**

- A. Manufacturer Amerex
- B. Model Number SafetyNet
- C. Dry Chemical Tank Capacity 25 lbs.
- D. Expellant Gas Tank Capacity Not Applicable

**38. Chassis Electrical**

- A. Multiplex System
  - i. Manufacturer Parker VANSCO
  - ii. Model Number Parker VANSCO

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**B. Starter Batteries**

- i. Manufacturer (DEKA) East Penn Manufacturing Co.
- ii. Model Number 8A8DT978
- iii. Type AGM-8D

**39. Alternator**

- A. Manufacturer BAE
- B. Type Beltless (Auxiliary power from ESS)
- C. Model Number APS-2
- D. Output at Idle 545 Amps
- E. Output at Maximum Speed 545 Amps
- F. Maximum Warranted Speed N/A Beltless rpm
- G. Speed at Idle N/A Beltless rpm
- H. Drive Type Beltless (Auxiliary power from ESS)

**40. Charge Air Cooler**

- A. Manufacturer EMP
- B. Material (s) Aluminum
- C. Core Area TBD in. x TBD in. = TBD in2.
- D. Number of tubes 15 rows
- E. Tube outer diameter 0.098 major in.
- F. Fins per inch 8.5
- G. Fin thickness 0.003 in.
- H. Fin construction Non-louvered wavy

**41. Chassis and Frame**

- A. Roof Structure Material High tensile steel tube
- B. Roof Anti-Corrosion Material Zinc rich primer
- C. Roof Skin Material Fiberglass
- D. Sidewall Structure Material High tensile steel tube

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- E. Sidewall Anti-Corrosion Material      Zinc rich primer and Corritube
- F. Sidewall Skin Material                      Fiberglass
- G. Skirt Material                                      Fiberglass
- H. Main Bus Structure/Frame Material    High Tensile steel tube and plate
- I. Main Bus Structure/Frame Anti-Corrosion Material Zinc rich primer, Coritube & Corishield

**42. Special Tools**

**A. Tools**

**B. Special Test Equipment**



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XDE35 Allison

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Bus Model Number: XDE35

**1. Dimensions**

**A. Overall Length**

- i. Over Bumpers      36 Feet      3 Inches
- ii. Over Body      35 Feet      5 Inches

**B. Overall Width**

- i. Over Body excluding mirrors and lights      102 Inches
- ii. Over body including mirrors      132 Inches
- iii. Over tires      102 Inches

**C. Overall Height**

- i. Excluding Roof-Mounted H&V System      126 Inches
- ii. Including Roof-Mounted H&V System      130 Inches

**D. Angle of Approach**

9.0 +/-0.5 Degrees

**E. Angle of Departure**

9.0 +/-0.5 Degrees

**F. Breakover Angle**

12.0 +/-0.5 Degrees

**G. Doorway Clear Opening **With Grab Handles** **No Grab Handles****

	<b>Width</b>	<b>Width</b>	<b>Height</b>
i. Front Door	<u>33.8</u> In.	<u>36.8</u> In.	<u>77.0</u> In.
ii. Rear Door	<u>40.9</u> In.	<u>45.2</u> In.	<u>77.3</u> In.

**K. Interior Head Room (center of aisle)**

- i. First Axle Location      79.5 Inches
- ii. Drive Axle Location      78 Inches

**L. Aisle Width**

- i. Minimum Width on Floor Between First Axle Wheel Housings      35.5 Inches
- ii. Minimum Width on Floor Between Second Axle Wheel Housings      41.5 Inches



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iii. Minimum Aisle Width Between Longitudinal Seats		<u>30.6</u> Inches
iv. Minimum Aisle Width Between Transverse Seats		<u>21.75</u> Inches
M. Minimum Ground Clearance		
i. Excluding Axles		<u>10.0</u> Inches
ii. At Axles		<u>5.6</u> Inches
N. Turning Envelope		
i. Outside Body Corner Turning Radius Including Bumper		<u>468</u> Inches
ii. Inside Turning Radius		<u>252</u> Inches
O. Wheel Base		
i. First axle to Drive axle		<u>226.75</u> Inches
P. Track		
i. First axle measured center of tire to center of tire		<u>87.5</u> Inches
ii. Drive axle measured center of dual tires to center of dual tires		<u>75</u> Inches
Q. Overhang, Centerline of Axle Over Bumper		
i. Front		<u>87.3</u> Inches
ii. Rear		<u>120.8</u> Inches
R. Floor		
i. Interior Length	<u>29</u> Feet	<u>7.5</u> Inches
ii. Interior Width	<u>8</u> Feet	<u>0</u> Inches
iii. Height of floor from ground level at front doors		<u>15.5</u> Inches
iv. Height of floor from ground level at back doors		<u>15.5</u> Inches
S. Capacity		
i. Total Number of Passenger Seats		<u>26</u>
ii. Total Number of Standing Passengers		<u>34</u>

Procurement of 30-ft, 40-ft and 60-ft Low Floor Diesel Hybrid Coaches

**1A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
30-FT LOW FLOOR DIESEL HYBRID COACHES**

<b>2. Bus Weight</b>	<b>Curb Weight</b>	<b>Curb Weight plus Seated Load</b>	<b>Curb Weight plus Gross Load (GVWR)</b>
A. First Axle	<u>8,460</u> lbs.	<u>9,121</u> lbs.	<u>11,628</u> lbs.
B. Drive Axle	<u>20,000</u> bs.	<u>23,389</u> lbs.	<u>25,982</u> lbs.
C. Total	<u>28,460</u> lbs.	<u>32,510</u> lbs.	<u>37,610</u> lbs.

**3. Bicycle Rack Provision**

A. Manufacturer Sportworks  
 B. Model TSB quick Release

**4. Paint**

A. Manufacturer Axalta  
 B. Type Imron Elite

**5. Windshield Wipers and Washer**

A. Manufacturer  
 B. Type Electric  
 C. Reservoir Capacity 5 gal.

**6. Bumpers**

A. Manufacturer Romeo Rim  
 B. Type 3 piece HELP

**7. Floor**

A. Subfloor  
 i. Material Thermo-Lite Board Series 2862  
 ii. Thickness 0.750 in.  
 B. Floor Covering  
 i. Manufacturer Altro  
 ii. Thickness 2.7mm / 0.11"

**1A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
30-FT LOW FLOOR DIESEL HYBRID COACHES**

**8. Windows**

A. Passenger Windows

- i. Manufacturer Arow Global (Stormtite)
- ii. Number of Windows 10 (including Driver's window)
- iii. Dimensions of Windows 42.12 in. (width) x 42.60 in. (height)  
62.28 in. (width) x 42.60 in. (height)  
62.28 in. (width) x 35.12 in. (height)
- iv. Total Window area (Street side) 13,800 sq. in.
- v. Total Window area (Curb side) 9,500 sq. in.

B. Rear Window

- i. Dimensions of Windows N/A in. (width) x N/A in. (height)

**9. Door System**

A. Manufacturer

Vapor

B. Model

- i. Front door Slide Glide
- ii. Rear door Slide Glide Activair

C. Open/Close Mechanism (air, electric, spring, other)

- i. Front door air
- ii. Rear door air

**10. Exterior Lighting**

A. LED Lights Manufacturer

J.W Speaker (headlights) & Dialight

B. Deceleration Lighting System

Manufacturer and Model Number

Dialight

**11. Interior Lights**

A. Manufacturer

TCB

B. Type

LED

C. Model Number

LED

D. Number of Fixtures

8

E. Size of Fixtures

72 to 96 inches

F. Power Supplies (Ballasts)

Not Applicable to LED

**1A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
30-FT LOW FLOOR DIESEL HYBRID COACHES**

**12. Heating and Ventilating Equipment**

- A. Heating System Capacity 105,000 B.T.U.
- B. Ventilating Capacity 2400 total cfm per passenger
- C. Heater Cores
  - i. Manufacturer & Model Thermo King
  - ii. Number of Rows 2
  - iii. Number of Fins per Inch 9
  - iv. Outer Diameter of Tube 0.375 In.
  - v. Fin Thickness 0.008 In.
  - vi. Number of Heater Cores 1
- D. Heater Blowers
  - i. Manufacturer & Model N/A
  - ii. Horsepower N/A
  - iii. Speed(s) N/A
  - iv. Capacity N/A cfm
- E. Controls
  - i. Manufacturer Thermo King
  - ii. Type Microprocessor
  - iii. Model Number IntelligAIRE III
- F. Heating Equipment Location 0 Above Engine Compt. 1 Roof  
0 Under Floor 0 Other (describe)

**13. Wheelchair Ramp Equipment**

- A. Manufacturer New Flyer
- B. Type Flip-out
- C. Model Number Gen II
- D. Capacity 660 lbs.
- E. Dimensions
  - i. Width of Ramp 32.0 In.
  - ii. Length of Ramp 47.5 In.

**1A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
30-FT LOW FLOOR DIESEL HYBRID COACHES**

F. Cycle Times	<b>Normal Idle</b>	<b>Fast Idle</b>
i. Stowed to Ground	<u>10 Sec.</u>	<u>10 Sec.</u>
ii. Ground to Stow	<u>10 Sec.</u>	<u>10 Sec.</u>
iii. Total Cycle	<u>20 Sec.</u>	<u>20 Sec.</u>
G. Weight of Complete Ramp	<u>130 lbs.</u>	

**14. Passenger Seat**

A. Manufacturer	<u>American Seating 6468</u>
B. Type	<u>Cantilever/Pedestal</u>
C. Seat Material	<u>Stainless Steel</u>
D. Seat Insert Material	<u>Fiberglass</u>
E. Minimum Hip-to-Knee Room	<u>27 in.</u>
F. Minimum Foot Room	<u>10.5 in</u>

**15. Destination Signs**

A. Manufacturer		
B. Size	<b>Rows</b>	<b>Columns</b>
i. Front Destination Sign	<u>16</u>	<u>112</u>
ii. Curb Side Destination Sign	<u>9</u>	<u>72</u>
iv. Rear Destination Sign	<u>14</u>	<u>108</u>
v. Dash Mount Run Number Sign	<u>14</u>	<u>40</u>

**16. Voice Annunciation System**

A. Manufacturer	<u>Digital Recorders Inc.</u>
B. Model Number	<u>DR600</u>

**17. Public Address System**

A. Microphone Manufacturer and Model	<u>Digital Recorders / AGC &amp; Sleath</u>	
B. Amplifier Manufacturer and Model	<u>DRI Stealth MIC processor Type 1</u>	
C. Number of Speaker(s)	<b>Inside</b>	<b>Outside</b>
	<u>6</u>	<u>1</u>

**1A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
30-FT LOW FLOOR DIESEL HYBRID COACHES**

**18. Surveillance Camera System**

- A. Manufacturer Kratos
- B. Number of Cameras 10
- C. Digital Disk Storage Capacity 72 hr. minimum

**19. Automatic Passenger Counter**

- A. Manufacturer UTA
- B. Model Number Smart Sensor

**20. Driver's Area**

- A. Steering Wheel
  - i. Manufacturer Vehicle Improvement Products
  - ii. Model Number BKBL1824D4V
  - iii. Size 18.00 diameter
- B. Operator's Seat
  - i. Manufacturer USSC
  - ii. Model Number 9100
- C. Driver Heater/Defroster
  - i. Manufacturer Mobile Climate Control
  - ii. Type 24 V Litton Motor
  - iii. Model Number 12-60020
  - iv. Capacity 84,000 B.T.U.
  - v. Blower Speed(s) 3 speeds
- D. Windshield
  - i. Dimensions (Length x Height) 49(per side) in. x 42 in.
  - ii. Number of Sections 2
  - iii. Material Laminate glass
  - iv. Thickness 0.232 to 0.260 Inches

**1A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
30-FT LOW FLOOR DIESEL HYBRID COACHES**

E. Driver's Side Window

- i. Dimensions (Length x Height) 42.16 in. x 41.78 in.
- ii. Number of Sections 2
- iii. Material Laminated Glass
- iv. Thickness 6 mm

F. Side Mirrors

	<b>Curb Side</b>	<b>Street Side</b>
i. Manufacturer(s)	<u>Lucerix</u>	<u>Lucerix</u>
ii. Model Number(s)	<u>32.602.00-01-12V</u>	<u>31.757.00-01-12V</u>

G. Storage Locker

- i. Number of Lockers 2
- ii. Size 10.5 + 11.7 Cu. Ft.
- iii. Location Above Driver and behind Driver's Seat

**21. Engine**

- A. Manufacturer Cummins
- B. Type 2013 Diesel
- C. Model Number ISL9 330
- D. Number of Cylinders 6 (six)
- E. Bore 4.49 In.
- F. Stroke 5.69 In.
- G. Displacement Cu. 543 In.
- H. Compression Ratio 16.6:1
- I. Injector Size & Type Bosch Closed Nozzle
- J. Power 330 HP      246 ( kW)      2200 at rpm
- K. Peak Torque 1100 lb. ft.      1491 ( Nm)      1300 at rpm
- L. Engine Speed at **Idle**      **Fast Idle**      **Governed**  
750 rpm      1000 rpm      2,800 rpm
- M. Dry Weight 1,695 lbs.
- N. Crankcase Oil Capacity
  - i. New Engine, Dry 6.3 Gals.

**1A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
30-FT LOW FLOOR DIESEL HYBRID COACHES**

- ii. New Engine, Wet 6.3 gals.
- O. Turbo Charger
  - i. Manufacturer Holset
  - ii. Type HX40
  - iii. Maximum rpm, not at load 2,800 rpm
  - iv. Maximum rpm, at full load 2,400 rpm

**22. Cooling System**

- A. Radiator
  - i. Manufacturer EMP
  - ii. Type Aluminum Bar-Plate
  - iii. Model Number XPL1
  - iv. Core Area TBD in. x TBD in. = TBD in<sup>2</sup>
  - v. Number of Tubes 37rows (radiator) 15 rows (CAC)
  - vi. Tube Outer Diameter 0.098 major In.
  - vii. Fins per Inch 8.5
  - viii. Fin Thickness 0.003 In.
  - ix. Fin Construction Non-louvered wavy
- B. Total Cooling System Capacity 23 gals.
- C. Radiator Fan Speed Control Type Electronic
- D. Surge Tank Capacity 5 gals
- E. Surge Tank Material Stainless Steel
- F. Engine Thermostat Temperature Settings Degrees 200 F
- G. Overheat Alarm Temperature Sending Unit Settings Degrees 225 F
- H. Maximum Ambient Operating Temperature Degree 235 F



**1A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
30-FT LOW FLOOR DIESEL HYBRID COACHES**

**23. Propulsion Generator**

- A. Manufacturer Allison
- B. Type In-line drive
- C. Size 33 in. x 25 in. x 21 in.
- D. Weight, Complete 944 lbs.
- E. Power Output 280W (330 hp) @ 2300rpm

**24. Traction Motor**

- A. Manufacturer Allison
- B. Type Parallel Hybrid Drive
- C. Model Number H 50 EP (Ev50)
- F. Oil Capacity (including heat exchanger) 13 gal.

**25. Energy Storage**

- A. Manufacturer Allison
- B. Type Nickel Metal Hydride
- C. Size 11.14 in. x 85.96 in. x 45.21 in.
- D. Weight, Complete 970 lbs.
- E. Power Output 432-780 Volts
- F. Cooling Requirement 2 kW Freon Evaporator

**26. Energy Storage Controller**

- A. Manufacturer Allison

**27. Propulsion Control System**

- A. Manufacturer Allison
- B. Cooling Media N/A
- C. Cooling Requirements N/A

**1A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
30-FT LOW FLOOR DIESEL HYBRID COACHES**

**28. Axle**

A. First Axle

- i. Manufacturer & Model Number MAN VOK-07-F
- ii. Type Reverse Elliot cast beam, dropped center, non-driven
- iii. Rating 15,873 lbs

B. Drive Axle Ratio

- i. Differential Ratio 4.56:1
- ii. Hub Reduction Ratio (if used) N/A
- iii. Final Axle Ratio (if hub reduction is used) 4.56:1

**29. Suspension**

A. Air Bags

- i. Manufacturer Firestone
- ii. Number of Air Bag per Wheel 2 Front 4 Rear
- iii. Total Air Bag Volume TBD Cu. In. TBD Cu. In.

B. Shock Absorbers

- i. Manufacturer Koni
- ii. Type double-acting, telescoping type
- iii. Number of Shock per Wheel 2 Front 4 Rear

**30. Brake System**

A. Fundamental System Manufacturer

Knorr

B. First Axle Brake Actuator Model and Part Number

MGM/ 1621705, 1621706

C. Drive Axle Brake Actuator Model and Part Number

MGM/ MJB2024ET752

D. First Axle Brake Rotor

- i. Manufacturer MAN
- ii. Part Number 81.50803.0040
- iii. Diameter 16.14

**1A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
30-FT LOW FLOOR DIESEL HYBRID COACHES**

- iv. Width TBD In.
  
- E. Drive Axle Brake Disc
  - i. Manufacturer MAN
  - ii. Part Number 81.50803.0041
  - iii. Diameter 16.14 In.
  - iv. Width TBD In.
  
- F. Brake Pad Manufacturer Ferodo
  
- G. First Axle Brake Pad Identification
  - i. Forward 81.50820.5104
  - ii. Reverse 81.50820.5104
  
- H. Drive Axle Brake Pad Identification
  - i. Forward 81.50820.5104
  - ii. Reverse 81.50820.5104
  
- I. Brake Pads 2 pads/caliper, 4 pads per axles
  
- J. Brake Pad Size
 

	<b>Length</b>	<b>Width</b>
i. First Axle	<u>7.09 In.</u>	<u>TBD In.</u>
ii. Drive Axle	<u>7.09 In.</u>	<u>TBD In.</u>
  
- K. Pad Thickness 0.827 In.
  
- L. Pad Area per Wheel
  - i. First Axle 30.38 Sq. In.
  - ii. Drive Axle 30.38 Sq. In.
  
- M. Anti-Lock Brake System Manufacturer WABCO

**31. Air System**

- A. Air Compressor
  - i. Manufacturer WABCO
  - ii. Type Twin Cylinder
  - iii. Model Number HD 30.4
  - iv. Capacity at Idle 6.9 cfm
  - v. Capacity at Maximum Speed 30.4 cfm
  - vi. Maximum Warranted Speed 3000 rpm

**1A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
30-FT LOW FLOOR DIESEL HYBRID COACHES**

- vii. Idle Speed 750 rpm
- viii. Drive Type Direct
- B. Air Reservoir Capacity
  - i. Supply Reservoir 800 Cu. In.
  - ii. Primary Reservoir 1200 Cu. In.
  - iii. Secondary Reservoir 2000 Cu. In.
  - iv. Parking Reservoir 2000 Cu. In.
  - v. Accessory Reservoir 1400 Cu. In.
  - vi. Other Reservoir 2150 Cu. In.
- C. Air Dryer
  - i. Manufacturer Graham White
  - ii. Model Number SludgeBreaker QBA60NX5

**32. Fuel System**

- A. Fuel Tank
  - i. Manufacturer New Flyer
  - ii. Size 100 usable Gallons
  - iii. Material Cross-linked polyethylene
- B. Filler
  - i. Manufacturer EMCO Wheaten
  - ii. Model Number Posi-snap

**33. Hydraulic System**

- A. Fan Drive
  - i. Manufacturer N/A, electric Radiator
  - ii. Type N/A, electric Radiator
  - iii. Model Number N/A, electric Radiator
- B. Power Steering
  - i. Steering Gear Manufacturer Sheppard
  - ii. Type M110
  - iii. Relief Pressure 2175 psi
  - iv. Power Steering Fluid Capacity 20 qts.

**1A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
30-FT LOW FLOOR DIESEL HYBRID COACHES**

v. Effort at Steering Wheel  
(Unloaded stationary coach  
on dry asphalt pavement)

9 lbs. to 10 degrees

**34. Wheels**

- A. Manufacturer Accuride
- B. Type Aluminum
- C. Size 22.5" x 8.25"
- D. Mounting Hub Piloted

**35. Tires**

- A. Manufacturer Customer Supplied Firestone
- B. Type Low Profile
- C. Size 305/70R22.5
- D. Load Range Depends on tire manufacturer
- E. Inflation Pressure 1st Axle Depends on tire manufacturer p.s.i. Drive Axle Depends on tire manufacturer p.s.i.

**36. Starter**

- A. Manufacturer N/A
- B. Model Number N/A
- C. Tank volume N/A

**37. Fire Detection/Suppression System**

- A. Manufacturer Amerex
- B. Model Number SafetyNet
- C. Dry Chemical Tank Capacity 25 lbs.
- D. Expellant Gas Tank Capacity Not Applicable

**38. Chassis Electrical**

- A. Multiplex System
  - i. Manufacturer Parker VANSCO
  - ii. Model Number Parker VANSCO

**1A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
30-FT LOW FLOOR DIESEL HYBRID COACHES**

**B. Starter Batteries**

- i. Manufacturer (DEKA) East Penn Manufacturing Co.
- ii. Model Number 8A8DT978
- iii. Type AGM-8D

**39. Alternator**

- A. Manufacturer EMP
- B. Type Air cooled
- C. Model Number Power 450
- D. Output at Idle 280 Amps
- E. Output at Maximum Speed 455 Amps
- F. Maximum Warranted Speed 6500 rpm
- G. Speed at Idle 2000 rpm
- H. Drive Type Belt

**40. Charge Air Cooler**

- A. Manufacturer EMP
- B. Material (s) Aluminum
- C. Core Area TBD in. x TBD in. = TBD in2.
- D. Number of tubes 15 rows
- E. Tube outer diameter 0.098 major in.
- F. Fins per inch 8.5
- G. Fin thickness 0.003 in.
- H. Fin construction Non-louvered wavy

**41. Chassis and Frame**

- A. Roof Structure Material High tensile steel tube
- B. Roof Anti-Corrosion Material Zinc rich primer
- C. Roof Skin Material Fiberglass
- D. Sidewall Structure Material High tensile steel tube

**1A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
30-FT LOW FLOOR DIESEL HYBRID COACHES**

- E. Sidewall Anti-Corrosion Material      Zinc rich primer and Corritube
- F. Sidewall Skin Material                      Fiberglass
- G. Skirt Material                                      Fiberglass
- H. Main Bus Structure/Frame Material      High Tensile steel tube and plate
- I. Main Bus Structure/Frame Anti-Corrosion Material Zinc rich primer, Coritube & Corishield

**42. Special Tools**

**A. Tools**

**B. Special Test Equipment**



CITY AND COUNTY OF SAN FRANCISCO  
San Francisco Municipal Transportation Agency  
Request for Proposals  
THE PROCUREMENT OF  
30-Foot, 40-FOOT AND 60-FOOT LOW FLOOR  
DIESEL HYBRID COACHES

Proposal Section	Title	Bid Submission Requirements
7	TECHNICAL PROPOSAL WORKSHEET	The Technical Proposal Worksheet, Follow-up Service Worksheet, and Delivery Schedule Worksheet included in Appendix B-Volume 1 RFP shall be completed in their entirety.

XDE40 BAE



**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

Bus Manufacturer: New Flyer of America Inc.

Bus Model Number: XDE40

**1. Dimensions**

A. Overall Length

- i. Over Bumpers      41 Feet      0 Inches
- ii. Over Body        40 Feet      2.0 Inches

B. Overall Width

- i. Over Body excluding mirrors and lights    102 Inches
- ii. Over body including mirrors                132 Inches
- iii. Over tires                                        102 Inches

C. Overall Height

- i. Excluding Roof-Mounted H&V System    126 Inches
- ii. Including Roof-Mounted H&V System    130 Inches

D. Angle of Approach                                9.0 +/-0.5 Degrees

E. Angle of Departure                                9.0 +/-0.5 Degrees

F. Breakover Angle                                    9.0 +/-0.5 Degrees

G. Doorway Clear Opening **With Grab Handles** **No Grab Handles**

	<b>Width</b>	<b>Width</b>	<b>Height</b>
i. Front Door	<u>33.8</u> In.	<u>36.8</u> In.	<u>77.0</u> In.
ii. Rear Door	<u>40.9</u> In.	<u>45.2</u> In.	<u>77.3</u> In.

K. Interior Head Room (center of aisle)

- i. First Axle Location                                79.5 Inches
- ii. Drive Axle Location                                78 Inches

L. Aisle Width

- i. Minimum Width on Floor Between First Axle Wheel Housings    35.5 Inches
- ii. Minimum Width on Floor Between Second Axle Wheel Housings    41.5 Inches

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

iii. Minimum Aisle Width Between Longitudinal Seats		<u>30.6</u> Inches
iv. Minimum Aisle Width Between Transverse Seats		<u>21.75</u> Inches
M. Minimum Ground Clearance		
i. Excluding Axles		<u>10.0</u> Inches
ii. At Axles		<u>5.6</u> Inches
N. Turning Envelope		
i. Outside Body Corner Turning Radius Including Bumper		<u>528</u> Inches
ii. Inside Turning Radius		<u>263</u> Inches
O. Wheel Base		
i. First axle to Drive axle		<u>283.75</u> Inches
P. Track		
i. First axle measured center of tire to center of tire		<u>87.5</u> Inches
ii. Drive axle measured center of dual tires to center of dual tires		<u>75</u> Inches
Q. Overhang, Centerline of Axle Over Bumper		
i. Front		<u>87.3</u> Inches
ii. Rear		<u>120.8</u> Inches
R. Floor		
i. Interior Length	<u>34</u> Feet	<u>7.5</u> Inches
ii. Interior Width	<u>8</u> Feet	<u>0</u> Inches
iii. Height of floor from ground level at front doors		<u>15.5</u> Inches
iv. Height of floor from ground level at back doors		<u>15.5</u> Inches
S. Capacity		
i. Total Number of Passenger Seats		<u>32</u>
ii. Total Number of Standing Passengers		<u>39</u>

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

<b>2. Bus Weight</b>	<b>Curb Weight</b>	<b>Curb Weight plus Seated Load</b>	<b>Curb Weight plus Gross Load (GVWR)</b>
A. First Axle	<u>9,460 lbs.</u>	<u>10,750 lbs.</u>	<u>13,519 lbs.</u>
B. Drive Axle	<u>21,200 bs.</u>	<u>23,860 lbs.</u>	<u>26,941 lbs.</u>
C. Total	<u>29,660 lbs.</u>	<u>34,610 lbs.</u>	<u>40,460 lbs.</u>

**3. Bicycle Rack Provision**

A. Manufacturer            Sportworks  
 B. Model                    TSB quick Release

**4. Paint**

A. Manufacturer            Axalta  
 B. Type                      Imron Elite

**5. Windshield Wipers and Washer**

A. Manufacturer  
 B. Type                      Electric  
 C. Reservoir Capacity      5 gal.

**6. Bumpers**

A. Manufacturer            Romeo Rim  
 B. Type                      3 piece HELP

**7. Floor**

A. Subfloor  
     i. Material                Thermo-Lite Board Series 2862  
     ii. Thickness            0.750 in.  
 B. Floor Covering  
     i. Manufacturer        Altro  
     ii. Thickness            2.7mm / 0.11"

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

**8. Windows**

A. Passenger Windows

- i. Manufacturer Arow Global (Stormtite)
- ii. Number of Windows 12 (including Driver's window)
- iii. Dimensions of Windows 42.12 in. (width) x 42.60 in. (height)  
62.28 in. (width) x 42.60 in. (height)  
62.28 in. (width) x 35.12 in. (height)
- iv. Total Window area (Street side) 15,800 sq. in.
- v. Total Window area (Curb side) 11,500 sq. in.

B. Rear Window

- i. Dimensions of Windows N/A in. (width) x N/A in. (height)

**9. Door System**

- A. Manufacturer Vapor
- B. Model
  - i. Front door Slide Glide
  - ii. Rear door Slide Glide Activair
- C. Open/Close Mechanism (air, electric, spring, other)
  - i. Front door air
  - ii. Rear door air

**10. Exterior Lighting**

- A. LED Lights Manufacturer J.W Speaker (headlights) & Dialight
- B. Deceleration Lighting System  
Manufacturer and Model Number Dialight

**11. Interior Lights**

- A. Manufacturer TCB
- B. Type LED
- C. Model Number LED
- D. Number of Fixtures 10
- E. Size of Fixtures 72 to 96 inches
- F. Power Supplies (Ballasts) Not Applicable to LED

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

**12. Heating and Ventilating Equipment**

- A. Heating System Capacity 105,000 B.T.U.
- B. Ventilating Capacity 2400 total cfm per passenger
- C. Heater Cores
  - i. Manufacturer & Model Thermo King
  - ii. Number of Rows 2
  - iii. Number of Fins per Inch 9
  - iv. Outer Diameter of Tube 0.375 In.
  - v. Fin Thickness 0.008 In.
  - vi. Number of Heater Cores 1
- D. Heater Blowers
  - i. Manufacturer & Model N/A
  - ii. Horsepower N/A
  - iii. Speed(s) N/A
  - iv. Capacity N/A cfm
- E. Controls
  - i. Manufacturer Thermo King
  - ii. Type Microprocessor
  - iii. Model Number IntelligAIRE III
- F. Heating Equipment Location 0 Above Engine Compt. 1 Roof  
0 Under Floor 0 Other (describe)

**13. Wheelchair Ramp Equipment**

- A. Manufacturer New Flyer
- B. Type Flip-out
- C. Model Number Gen II
- D. Capacity 660 lbs.
- E. Dimensions
  - i. Width of Ramp 32.0 In.
  - ii. Length of Ramp 47.5 In.

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

F. Cycle Times	<b>Normal Idle</b>	<b>Fast Idle</b>
i. Stowed to Ground	<u>10 Sec.</u>	<u>10 Sec.</u>
ii. Ground to Stow	<u>10 Sec.</u>	<u>10 Sec.</u>
iii. Total Cycle	<u>20 Sec.</u>	<u>20 Sec.</u>
G. Weight of Complete Ramp	<u>130 lbs.</u>	

**14. Passenger Seat**

A. Manufacturer	<u>American Seating 6468</u>
B. Type	<u>Cantilever/Pedestal</u>
C. Seat Material	<u>Stainless Steel</u>
D. Seat Insert Material	<u>Fiberglass</u>
E. Minimum Hip-to-Knee Room	<u>27 in.</u>
F. Minimum Foot Room	<u>10.5 in</u>

**15. Destination Signs**

A. Manufacturer		
B. Size	<b>Rows</b>	<b>Columns</b>
i. Front Destination Sign	<u>16</u>	<u>112</u>
ii. Curb Side Destination Sign	<u>9</u>	<u>72</u>
iv. Rear Destination Sign	<u>14</u>	<u>108</u>
v. Dash Mount Run Number Sign	<u>14</u>	<u>40</u>

**16. Voice Annunciation System**

A. Manufacturer	<u>Digital Recorders Inc.</u>
B. Model Number	<u>DR600</u>

**17. Public Address System**

A. Microphone Manufacturer and Model	<u>Digital Recorders / AGC &amp; Sleath</u>	
B. Amplifier Manufacturer and Model	<u>DRI Stealth MIC processor Type 1</u>	
C. Number of Speaker(s)	<b>Inside</b>	<b>Outside</b>
	<u>6</u>	<u>1</u>

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

**18. Surveillance Camera System**

- A. Manufacturer Kratos
- B. Number of Cameras 10
- C. Digital Disk Storage Capacity 72 hr. minimum

**19. Automatic Passenger Counter**

- A. Manufacturer UTA
- B. Model Number Smart Sensor

**20. Driver's Area**

- A. Steering Wheel
  - i. Manufacturer Vehicle Improvement Products
  - ii. Model Number BKBL1824D4V
  - iii. Size 18.00 diameter
- B. Operator's Seat
  - i. Manufacturer USSC
  - ii. Model Number 9100
- C. Driver Heater/Defroster
  - i. Manufacturer Mobile Climate Control
  - ii. Type 24 V Litton Motor
  - iii. Model Number 12-60020
  - iv. Capacity 84,000 B.T.U.
  - v. Blower Speed(s) 3 speeds
- D. Windshield
  - i. Dimensions (Length x Height) 49(per side) in. x 42 in.
  - ii. Number of Sections 2
  - iii. Material Laminate glass
  - iv. Thickness 0.232 to 0.260 Inches

Procurement of 30-ft, 40-ft and 60-ft Low Floor Diesel Hybrid Coaches

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

E. Driver's Side Window

- i. Dimensions (Length x Height) 42.16 in. x 41.78 in.
- ii. Number of Sections 2
- iii. Material Laminated Glass
- iv. Thickness 6 mm

F. Side Mirrors

	<b>Curb Side</b>	<b>Street Side</b>
i. Manufacturer(s)	<u>Lucerix</u>	<u>Lucerix</u>
ii. Model Number(s)	<u>32.602.00-01-12V</u>	<u>31.757.00-01-12V</u>

G. Storage Locker

- i. Number of Lockers 2
- ii. Size 10.5 + 11.7 Cu. Ft.
- iii. Location Above Driver and behind Driver's Seat

**21. Engine**

- A. Manufacturer Cummins
- B. Type 2013 Diesel
- C. Model Number ISB 6.7 280
- D. Number of Cylinders 6 (six)
- E. Bore 4.21 In.
- F. Stroke 4.88 In.
- G. Displacement Cu. 408 In.
- H. Compression Ratio 17.3:1
- I. Injector Size & Type Bosch Closed Nozzle
- J. Power 280 HP      209 ( kW)      2400 at rpm
- K. Peak Torque 660 lb. ft.      895 ( Nm)      1600 at rpm
- L. Engine Speed at **Idle**      **Fast Idle**      **Governed**  
700 rpm      900 rpm      2,800 rpm
- M. Dry Weight 1,150 lbs.
- N. Crankcase Oil Capacity
  - i. New Engine, Dry 3 Gals.



**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

- ii. New Engine, Wet            3 gals.
- O. Turbo Charger
  - i. Manufacturer                Holset
  - ii. Type                            HX40
  - iii. Maximum rpm, not at load    2,800 rpm
  - iv. Maximum rpm, at full load    2,400 rpm

**22. Cooling System**

- A. Radiator
  - i. Manufacturer                EMP
  - ii. Type                            Aluminum Bar-Plate
  - iii. Model Number              XPL1
  - iv. Core Area                    TBD in. x TBD in. = TBD in<sup>2</sup>
  - v. Number of Tubes            37rows (radiator) 15 rows (CAC)
  - vi. Tube Outer Diameter       0.098 major In.
  - vii. Fins per Inch               8.5
  - viii. Fin Thickness              0.003 In.
  - ix. Fin Construction            Non-louvered wavy
- B. Total Cooling System Capacity            23 gals.
- C. Radiator Fan Speed Control Type        Electronic
- D. Surge Tank Capacity                        5 gals
- E. Surge Tank Material                        Stainless Steel
- F. Engine Thermostat Temperature  
Settings Degrees                                200 F
- G. Overheat Alarm Temperature  
Sending Unit Settings Degrees                225 F
- H. Maximum Ambient Operating Temperature Degree        235 F

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

**23. Propulsion Generator**

- A. Manufacturer BAE
- B. Type In-line drive
- C. Size 6 in. x 23.6 in. x 23.6 in.
- D. Weight, Complete 804 lbs.
- E. Power Output 200 kW (268 hp) @ 2300rpm

**24. Traction Motor**

- A. Manufacturer BAE
- B. Type Series Hybrid Drive
- C. Model Number HDS200
- F. Oil Capacity (including heat exchanger) 3 gal.

**25. Energy Storage**

- A. Manufacturer BAE
- B. Type Nano-iron-phosphate
- C. Size 200 kW peak
- D. Weight, Complete 800 lbs.
- E. Power Output 635 Vdc nominal
- F. Cooling Requirement Ambient air-cooled

**26. Energy Storage Controller**

- A. Manufacturer BAE

**27. Propulsion Control System**

- A. Manufacturer BAE
- B. Cooling Media water ethylene/glycol (or propylene glycol)
- C. Cooling Requirements 15gpm (57 lpm)

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

**28. Axle**

A. First Axle

- i. Manufacturer & Model Number MAN VOK-07-F
- ii. Type Reverse Elliot cast beam, dropped center, non-driven
- iii. Rating 15,873 lbs

B. Drive Axle Ratio

- i. Differential Ratio 4.56:1
- ii. Hub Reduction Ratio (if used) N/A
- iii. Final Axle Ratio (if hub reduction is used) 4.56:1

**29. Suspension**

A. Air Bags

- i. Manufacturer Firestone
- ii. Number of Air Bag per Wheel 2 Front      4 Rear
- iii. Total Air Bag Volume TBD Cu. In.    TBD Cu. In.

B. Shock Absorbers

- i. Manufacturer Koni
- ii. Type double-acting, telescoping type
- iii. Number of Shock per Wheel 2 Front      4 Rear

**30. Brake System**

A. Fundamental System Manufacturer

Knorr

B. First Axle Brake Actuator Model and Part Number

MGM/ 1621705, 1621706

C. Drive Axle Brake Actuator Model and Part Number

MGM/ MJB2024ET752

D. First Axle Brake Rotor

- i. Manufacturer MAN
- ii. Part Number 81.50803.0040
- iii. Diameter 16.14

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

iv. Width	<u>TBD In.</u>	
E. Drive Axle Brake Disc		
i. Manufacturer	<u>MAN</u>	
ii. Part Number	<u>81.50803.0041</u>	
iii. Diameter	<u>16.14 In.</u>	
iv. Width	<u>TBD In.</u>	
F. Brake Pad Manufacturer	<u>Ferodo</u>	
G. First Axle Brake Pad Identification		
i. Forward	<u>81.50820.5104</u>	
ii. Reverse	<u>81.50820.5104</u>	
H. Drive Axle Brake Pad Identification		
i. Forward	<u>81.50820.5104</u>	
ii. Reverse	<u>81.50820.5104</u>	
I. Brake Pads	<u>2 pads/caliper, 4 pads per axles</u>	
J. Brake Pad Size	<b>Length</b>	<b>Width</b>
i. First Axle	<u>7.09 In.</u>	<u>TBD In.</u>
ii. Drive Axle	<u>7.09 In.</u>	<u>TBD In.</u>
K. Pad Thickness	<u>0.827 In.</u>	
L. Pad Area per Wheel		
i. First Axle	<u>30.38 Sq. In.</u>	
ii. Drive Axle	<u>30.38 Sq. In.</u>	
M. Anti-Lock Brake System Manufacturer	<u>WABCO</u>	

**31. Air System**

A. Air Compressor	
i. Manufacturer	<u>Powerex</u>
ii. Type	<u>Scroll</u>
iii. Model Number	<u>SLAEOSE-HP</u>
iv. Capacity at Idle	<u>13.5 cfm</u>
v. Capacity at Maximum Speed	<u>13.5 cfm</u>
vi. Maximum Warranted Speed	<u>TBD rpm</u>

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

- vii. Idle Speed TBD rpm
- viii. Drive Type Belt to electric motor
- B. Air Reservoir Capacity
  - i. Supply Reservoir 800 Cu. In.
  - ii. Primary Reservoir 1200 Cu. In.
  - iii. Secondary Reservoir 2000 Cu. In.
  - iv. Parking Reservoir 2000 Cu. In.
  - v. Accessory Reservoir 1400 Cu. In.
  - vi. Other Reservoir 2150 Cu. In.
- C. Air Dryer
  - i. Manufacturer Graham White
  - ii. Model Number SludgeBreaker QBA60NX5

**32. Fuel System**

- A. Fuel Tank
  - i. Manufacturer New Flyer
  - ii. Size 100 usable Gallons
  - iii. Material Cross-linked polyethylene
- B. Filler
  - i. Manufacturer EMCO Wheaten
  - ii. Model Number Posi-snap

**33. Hydraulic System**

- A. Fan Drive
  - i. Manufacturer N/A, electric Radiator
  - ii. Type N/A, electric Radiator
  - iii. Model Number N/A, electric Radiator
- B. Power Steering
  - i. Steering Gear Manufacturer Sheppard
  - ii. Type M110
  - iii. Relief Pressure 2175 psi
  - iv. Power Steering Fluid Capacity 20 qts.

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

v. Effort at Steering Wheel  
(Unloaded stationary coach  
on dry asphalt pavement)

9 lbs. to 10 degrees

**34. Wheels**

- A. Manufacturer Accuride
- B. Type Aluminum
- C. Size 22.5" x 8.25"
- D. Mounting Hub Piloted

**35. Tires**

- A. Manufacturer Customer Supplied Firestone
- B. Type Low Profile
- C. Size 305/70R22.5
- D. Load Range Depends on tire manufacturer
- E. Inflation Pressure 1st Axle Depends on tire manufacturer p.s.i. Drive Axle Depends on tire manufacturer p.s.i.

**36. Starter**

- A. Manufacturer N/A
- B. Model Number N/A
- C. Tank volume N/A

**37. Fire Detection/Suppression System**

- A. Manufacturer Amerex
- B. Model Number SafetyNet
- C. Dry Chemical Tank Capacity 25 lbs.
- D. Expellant Gas Tank Capacity Not Applicable

**38. Chassis Electrical**

- A. Multiplex System
  - i. Manufacturer Parker VANSCO
  - ii. Model Number Parker VANSCO

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

**B. Starter Batteries**

- i. Manufacturer (DEKA) East Penn Manufacturing Co.
- ii. Model Number 8A8DT978
- iii. Type AGM-8D

**39. Alternator**

- A. Manufacturer BAE
- B. Type Beltless (Auxiliary power from ESS)
- C. Model Number APS-2
- D. Output at Idle 545 Amps
- E. Output at Maximum Speed 545 Amps
- F. Maximum Warranted Speed N/A Beltless rpm
- G. Speed at Idle N/A Beltless rpm
- H. Drive Type Beltless (Auxiliary power from ESS)

**40. Charge Air Cooler**

- A. Manufacturer EMP
- B. Material (s) Aluminum
- C. Core Area TBD in. x TBD in. = TBD in2.
- D. Number of tubes 15 rows
- E. Tube outer diameter 0.098 major in.
- F. Fins per inch 8.5
- G. Fin thickness 0.003 in.
- H. Fin construction Non-louvered wavy

**41. Chassis and Frame**

- A. Roof Structure Material High tensile steel tube
- B. Roof Anti-Corrosion Material Zinc rich primer
- C. Roof Skin Material Fiberglass
- D. Sidewall Structure Material High tensile steel tube

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

E. Sidewall Anti-Corrosion Material Zinc rich primer and Corritube

F. Sidewall Skin Material Fiberglass

G. Skirt Material Fiberglass

H. Main Bus Structure/Frame Material High Tensile steel tube and plate

I. Main Bus Structure/Frame Anti-Corrosion Material Zinc rich primer, Coritube & Corishield

**42. Special Tools**

**A. Tools**

**B. Special Test Equipment**





CITY AND COUNTY OF SAN FRANCISCO  
San Francisco Municipal Transportation Agency  
Request for Proposals  
THE PROCUREMENT OF  
30-Foot, 40-FOOT AND 60-FOOT LOW FLOOR  
DIESEL HYBRID COACHES

Proposal Section	Title	Bid Submission Requirements
7	TECHNICAL PROPOSAL WORKSHEET	The Technical Proposal Worksheet, Follow-up Service Worksheet, and Delivery Schedule Worksheet included in Appendix B-Volume 1 RFP shall be completed in their entirety.

XDE40 Allison

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

Bus Manufacturer: New Flyer of America Inc.

Bus Model Number: XDE40

**1. Dimensions**

A. Overall Length

- i. Over Bumpers      41 Feet      0 Inches
- ii. Over Body      40 Feet      2.0 Inches

B. Overall Width

- i. Over Body excluding mirrors and lights      102 Inches
- ii. Over body including mirrors      132 Inches
- iii. Over tires      102 Inches

C. Overall Height

- i. Excluding Roof-Mounted H&V System      126 Inches
- ii. Including Roof-Mounted H&V System      130 Inches

D. Angle of Approach

9.0 +/-0.5 Degrees

E. Angle of Departure

9.0 +/-0.5 Degrees

F. Breakover Angle

9.0 +/-0.5 Degrees

G. Doorway Clear Opening **With Grab Handles** **No Grab Handles**

	<b>Width</b>	<b>Width</b>	<b>Height</b>
i. Front Door	<u>33.8</u> In.	<u>36.8</u> In.	<u>77.0</u> In.
ii. Rear Door	<u>40.9</u> In.	<u>45.2</u> In.	<u>77.3</u> In.

K. Interior Head Room (center of aisle)

- i. First Axle Location      79.5 Inches
- ii. Drive Axle Location      78 Inches

L. Aisle Width

- i. Minimum Width on Floor Between First Axle Wheel Housings      35.5 Inches
- ii. Minimum Width on Floor Between Second Axle Wheel Housings      41.5 Inches

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

iii. Minimum Aisle Width Between Longitudinal Seats		<u>30.6</u> Inches
iv. Minimum Aisle Width Between Transverse Seats		<u>21.75</u> Inches
M. Minimum Ground Clearance		
i. Excluding Axles		<u>10.0</u> Inches
ii. At Axles		<u>5.6</u> Inches
N. Turning Envelope		
i. Outside Body Corner Turning Radius Including Bumper		<u>528</u> Inches
ii. Inside Turning Radius		<u>263</u> Inches
O. Wheel Base		
i. First axle to Drive axle		<u>283.75</u> Inches
P. Track		
i. First axle measured center of tire to center of tire		<u>87.5</u> Inches
ii. Drive axle measured center of dual tires to center of dual tires		<u>75</u> Inches
Q. Overhang, Centerline of Axle Over Bumper		
i. Front		<u>87.3</u> Inches
ii. Rear		<u>120.8</u> Inches
R. Floor		
i. Interior Length	<u>34</u> Feet	<u>7.5</u> Inches
ii. Interior Width	<u>8</u> Feet	<u>0</u> Inches
iii. Height of floor from ground level at front doors		<u>15.5</u> Inches
iv. Height of floor from ground level at back doors		<u>15.5</u> Inches
S. Capacity		
i. Total Number of Passenger Seats		<u>32</u>
ii. Total Number of Standing Passengers		<u>39</u>

Procurement of 30-ft, 40-ft and 60-ft Low Floor Diesel Hybrid Coaches

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

<b>2. Bus Weight</b>	<b>Curb Weight</b>	<b>Curb Weight plus Seated Load</b>	<b>Curb Weight plus Gross Load (GVWR)</b>
A. First Axle	<u>9,460</u> lbs.	<u>10,750</u> lbs.	<u>13,519</u> lbs.
B. Drive Axle	<u>21,200</u> lbs.	<u>23,860</u> lbs.	<u>26,941</u> lbs.
C. Total	<u>29,660</u> lbs.	<u>34,610</u> lbs.	<u>40,460</u> lbs.

**3. Bicycle Rack Provision**

A. Manufacturer Sportworks  
 B. Model TSB quick Release

**4. Paint**

A. Manufacturer Axalta  
 B. Type Imron Elite

**5. Windshield Wipers and Washer**

A. Manufacturer  
 B. Type Electric  
 C. Reservoir Capacity 5 gal.

**6. Bumpers**

A. Manufacturer Romeo Rim  
 B. Type 3 piece HELP

**7. Floor**

A. Subfloor  
     i. Material Thermo-Lite Board Series 2862  
     ii. Thickness 0.750 in.  
 B. Floor Covering  
     i. Manufacturer Altro  
     ii. Thickness 2.7mm / 0.11"

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

**8. Windows**

A. Passenger Windows

- i. Manufacturer Arow Global (Stormtite)
- ii. Number of Windows 12 (including Driver's window)
- iii. Dimensions of Windows 42.12 in. (width) x 42.60 in. (height)  
62.28 in. (width) x 42.60 in. (height)  
62.28 in. (width) x 35.12 in. (height)
- iv. Total Window area (Street side) 15,800 sq. in.
- v. Total Window area (Curb side) 11,500 sq. in.

B. Rear Window

- i. Dimensions of Windows N/A in. (width) x N/A in. (height)

**9. Door System**

A. Manufacturer

Vapor

B. Model

- i. Front door Slide Glide
- ii. Rear door Slide Glide Activair

C. Open/Close Mechanism (air, electric, spring, other)

- i. Front door air
- ii. Rear door air

**10. Exterior Lighting**

A. LED Lights Manufacturer

J.W Speaker (headlights) & Dialight

B. Deceleration Lighting System

Manufacturer and Model Number

Dialight

**11. Interior Lights**

A. Manufacturer

TCB

B. Type

LED

C. Model Number

LED

D. Number of Fixtures

10

E. Size of Fixtures

72 to 96 inches

F. Power Supplies (Ballasts)

Not Applicable to LED

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

**12. Heating and Ventilating Equipment**

- A. Heating System Capacity 105,000 B.T.U.
- B. Ventilating Capacity 2400 total cfm per passenger
- C. Heater Cores
  - i. Manufacturer & Model Thermo King
  - ii. Number of Rows 2
  - iii. Number of Fins per Inch 9
  - iv. Outer Diameter of Tube 0.375 In.
  - v. Fin Thickness 0.008 In.
  - vi. Number of Heater Cores 1
- D. Heater Blowers
  - i. Manufacturer & Model N/A
  - ii. Horsepower N/A
  - iii. Speed(s) N/A
  - iv. Capacity N/A cfm
- E. Controls
  - i. Manufacturer Thermo King
  - ii. Type Microprocessor
  - iii. Model Number IntelligAIRE III
- F. Heating Equipment Location 0 Above Engine Compt. 1 Roof  
0 Under Floor 0 Other (describe)

**13. Wheelchair Ramp Equipment**

- A. Manufacturer New Flyer
- B. Type Flip-out
- C. Model Number Gen II
- D. Capacity 660 lbs.
- E. Dimensions
  - i. Width of Ramp 32.0 In.
  - ii. Length of Ramp 47.5 In.

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

F. Cycle Times	<b>Normal Idle</b>	<b>Fast Idle</b>
i. Stowed to Ground	<u>10 Sec.</u>	<u>10 Sec.</u>
ii. Ground to Stow	<u>10 Sec.</u>	<u>10 Sec.</u>
iii. Total Cycle	<u>20 Sec.</u>	<u>20 Sec.</u>
G. Weight of Complete Ramp	<u>130 lbs.</u>	

**14. Passenger Seat**

A. Manufacturer	<u>American Seating 6468</u>
B. Type	<u>Cantilever/Pedestal</u>
C. Seat Material	<u>Stainless Steel</u>
D. Seat Insert Material	<u>Fiberglass</u>
E. Minimum Hip-to-Knee Room	<u>27 in.</u>
F. Minimum Foot Room	<u>10.5 in</u>

**15. Destination Signs**

A. Manufacturer		
B. Size	<b>Rows</b>	<b>Columns</b>
i. Front Destination Sign	<u>16</u>	<u>112</u>
ii. Curb Side Destination Sign	<u>9</u>	<u>72</u>
iv. Rear Destination Sign	<u>14</u>	<u>108</u>
v. Dash Mount Run Number Sign	<u>14</u>	<u>40</u>

**16. Voice Annunciation System**

A. Manufacturer	<u>Digital Recorders Inc.</u>
B. Model Number	<u>DR600</u>

**17. Public Address System**

A. Microphone Manufacturer and Model	<u>Digital Recorders / AGC &amp; Sleath</u>	
B. Amplifier Manufacturer and Model	<u>DRI Stealth MIC processor Type 1</u>	
C. Number of Speaker(s)	<b>Inside</b>	<b>Outside</b>
	<u>6</u>	<u>1</u>

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

**18. Surveillance Camera System**

- A. Manufacturer Kratos
- B. Number of Cameras 10
- C. Digital Disk Storage Capacity 72 hr. minimum

**19. Automatic Passenger Counter**

- A. Manufacturer UTA
- B. Model Number Smart Sensor

**20. Driver's Area**

- A. Steering Wheel
  - i. Manufacturer Vehicle Improvement Products
  - ii. Model Number BKBL1824D4V
  - iii. Size 18.00 diameter
- B. Operator's Seat
  - i. Manufacturer USSC
  - ii. Model Number 9100
- C. Driver Heater/Defroster
  - i. Manufacturer Mobile Climate Control
  - ii. Type 24 V Litton Motor
  - iii. Model Number 12-60020
  - iv. Capacity 84,000 B.T.U.
  - v. Blower Speed(s) 3 speeds
- D. Windshield
  - i. Dimensions (Length x Height) 49(per side) in. x 42 in.
  - ii. Number of Sections 2
  - iii. Material Laminate glass
  - iv. Thickness 0.232 to 0.260 Inches



Procurement of 30-ft, 40-ft and 60-ft Low Floor Diesel Hybrid Coaches

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

E. Driver's Side Window

- i. Dimensions (Length x Height) 42.16 in. x 41.78 in.
- ii. Number of Sections 2
- iii. Material Laminated Glass
- iv. Thickness 6 mm

F. Side Mirrors

- |                     | <b>Curb Side</b>        | <b>Street Side</b>      |
|---------------------|-------------------------|-------------------------|
| i. Manufacturer(s)  | <u>Lucerix</u>          | <u>Lucerix</u>          |
| ii. Model Number(s) | <u>32.602.00-01-12V</u> | <u>31.757.00-01-12V</u> |

G. Storage Locker

- i. Number of Lockers 2
- ii. Size 10.5 + 11.7 Cu. Ft.
- iii. Location Above Driver and behind Driver's Seat

**21. Engine**

- A. Manufacturer Cummins
- B. Type 2013 Diesel
- C. Model Number ISL9 330
- D. Number of Cylinders 6 (six)
- E. Bore 4.49 In.
- F. Stroke 5.69 In.
- G. Displacement Cu. 543 In.
- H. Compression Ratio 16.6:1
- I. Injector Size & Type Bosch Closed Nozzle
- J. Power 330 HP     246 ( kW)     2200 at rpm
- K. Peak Torque 1100 lb. ft.     1491 ( Nm)     1300 at rpm
- L. Engine Speed at **Idle**     **Fast Idle**     **Governed**  
                                  750 rpm     1000 rpm     2,800 rpm
- M. Dry Weight 1,695 lbs.
- N. Crankcase Oil Capacity
  - i. New Engine, Dry 6.3 Gals.

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

- ii. New Engine, Wet 6.3 gals.
- O. Turbo Charger
  - i. Manufacturer Holset
  - ii. Type HX40
  - iii. Maximum rpm, not at load 2,800 rpm
  - iv. Maximum rpm, at full load 2,400 rpm

**22. Cooling System**

- A. Radiator
  - i. Manufacturer EMP
  - ii. Type Aluminum Bar-Plate
  - iii. Model Number XPL1
  - iv. Core Area TBD in. x TBD in. = TBD in<sup>2</sup>
  - v. Number of Tubes 37rows (radiator) 15 rows (CAC)
  - vi. Tube Outer Diameter 0.098 major In.
  - vii. Fins per Inch 8.5
  - viii. Fin Thickness 0.003 In.
  - ix. Fin Construction Non-louvered wavy
- B. Total Cooling System Capacity 23 gals.
- C. Radiator Fan Speed Control Type Electronic
- D. Surge Tank Capacity 5 gals
- E. Surge Tank Material Stainless Steel
- F. Engine Thermostat Temperature Settings Degrees 200 F
- G. Overheat Alarm Temperature Sending Unit Settings Degrees 225 F
- H. Maximum Ambient Operating Temperature Degree 235 F

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

**23. Propulsion Generator**

- A. Manufacturer Allison
- B. Type In-line drive
- C. Size 33 in. x 25 in. x 21 in.
- D. Weight, Complete 944 lbs.
- E. Power Output 280W (330 hp) @ 2300rpm

**24. Traction Motor**

- A. Manufacturer Allison
- B. Type Parallel Hybrid Drive
- C. Model Number H 50 EP (Ev50)
- F. Oil Capacity (including heat exchanger) 13 gal.

**25. Energy Storage**

- A. Manufacturer Allison
- B. Type Nickel Metal Hydride
- C. Size 11.14 in. x 85.96 in. x 45.21 in.
- D. Weight, Complete 970 lbs.
- E. Power Output 432-780 Volts
- F. Cooling Requirement 2 kW Freon Evaporator

**26. Energy Storage Controller**

- A. Manufacturer Allison

**27. Propulsion Control System**

- A. Manufacturer Allison
- B. Cooling Media N/A
- C. Cooling Requirements N/A

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

**28. Axle**

A. First Axle

- i. Manufacturer & Model Number MAN VOK-07-F
- ii. Type Reverse Elliot cast beam, dropped center, non-driven
- iii. Rating 15,873 lbs

B. Drive Axle Ratio

- i. Differential Ratio 4.56:1
- ii. Hub Reduction Ratio (if used) N/A
- iii. Final Axle Ratio (if hub reduction is used) 4.56:1

**29. Suspension**

A. Air Bags

- i. Manufacturer Firestone
- ii. Number of Air Bag per Wheel 2 Front 4 Rear
- iii. Total Air Bag Volume TBD Cu. In. TBD Cu. In.

B. Shock Absorbers

- i. Manufacturer Koni
- ii. Type double-acting, telescoping type
- iii. Number of Shock per Wheel 2 Front 4 Rear

**30. Brake System**

A. Fundamental System Manufacturer

Knorr

B. First Axle Brake Actuator Model and Part Number

MGM/ 1621705, 1621706

C. Drive Axle Brake Actuator Model and Part Number

MGM/ MJB2024ET752

D. First Axle Brake Rotor

- i. Manufacturer MAN
- ii. Part Number 81.50803.0040
- iii. Diameter 16.14

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

iv. Width	<u>TBD In.</u>	
E. Drive Axle Brake Disc		
i. Manufacturer	<u>MAN</u>	
ii. Part Number	<u>81.50803.0041</u>	
iii. Diameter	<u>16.14 In.</u>	
iv. Width	<u>TBD In.</u>	
F. Brake Pad Manufacturer	<u>Ferrodo</u>	
G. First Axle Brake Pad Identification		
i. Forward	<u>81.50820.5104</u>	
ii. Reverse	<u>81.50820.5104</u>	
H. Drive Axle Brake Pad Identification		
i. Forward	<u>81.50820.5104</u>	
ii. Reverse	<u>81.50820.5104</u>	
I. Brake Pads	<u>2 pads/caliper, 4 pads per axles</u>	
J. Brake Pad Size	<b>Length</b>	<b>Width</b>
i. First Axle	<u>7.09 In.</u>	<u>TBD In.</u>
ii. Drive Axle	<u>7.09 In.</u>	<u>TBD In.</u>
K. Pad Thickness	<u>0.827 In.</u>	
L. Pad Area per Wheel		
i. First Axle	<u>30.38 Sq. In.</u>	
ii. Drive Axle	<u>30.38 Sq. In.</u>	
M. Anti-Lock Brake System Manufacturer	<u>WABCO</u>	

**31. Air System**

A. Air Compressor	
i. Manufacturer	<u>WABCO</u>
ii. Type	<u>Twin Cylinder</u>
iii. Model Number	<u>HD 30.4</u>
iv. Capacity at Idle	<u>6.9 cfm</u>
v. Capacity at Maximum Speed	<u>30.4 cfm</u>
vi. Maximum Warranted Speed	<u>3000 rpm</u>

Procurement of 30-ft, 40-ft and 60-ft Low Floor Diesel Hybrid Coaches

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

- vii. Idle Speed 750 rpm
- viii. Drive Type Direct
- B. Air Reservoir Capacity
  - i. Supply Reservoir 800 Cu. In.
  - ii. Primary Reservoir 1200 Cu. In.
  - iii. Secondary Reservoir 2000 Cu. In.
  - iv. Parking Reservoir 2000 Cu. In.
  - v. Accessory Reservoir 1400 Cu. In.
  - vi. Other Reservoir 2150 Cu. In.
- C. Air Dryer
  - i. Manufacturer Graham White
  - ii. Model Number SludgeBreaker QBA60NX5

**32. Fuel System**

- A. Fuel Tank
  - i. Manufacturer New Flyer
  - ii. Size 100 usable Gallons
  - iii. Material Cross-linked polyethylene
- B. Filler
  - i. Manufacturer EMCO Wheaten
  - ii. Model Number Posi-snap

**33. Hydraulic System**

- A. Fan Drive
  - i. Manufacturer N/A, electric Radiator
  - ii. Type N/A, electric Radiator
  - iii. Model Number N/A, electric Radiator
- B. Power Steering
  - i. Steering Gear Manufacturer Sheppard
  - ii. Type M110
  - iii. Relief Pressure 2175 psi
  - iv. Power Steering Fluid Capacity 20 qts.

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

v. Effort at Steering Wheel  
(Unloaded stationary coach  
on dry asphalt pavement)

9 lbs. to 10 degrees

**34. Wheels**

- A. Manufacturer Accuride
- B. Type Aluminum
- C. Size 22.5" x 8.25"
- D. Mounting Hub Piloted

**35. Tires**

- A. Manufacturer Customer Supplied Firestone
- B. Type Low Profile
- C. Size 305/70R22.5
- D. Load Range Depends on tire manufacturer
- E. Inflation Pressure 1st Axle Depends on tire manufacturer p.s.i. Drive Axle Depends on tire manufacturer p.s.i.

**36. Starter**

- A. Manufacturer N/A
- B. Model Number N/A
- C. Tank volume N/A

**37. Fire Detection/Suppression System**

- A. Manufacturer Amerex
- B. Model Number SafetyNet
- C. Dry Chemical Tank Capacity 25 lbs.
- D. Expellant Gas Tank Capacity Not Applicable

**38. Chassis Electrical**

- A. Multiplex System
  - i. Manufacturer Parker VANSCO
  - ii. Model Number Parker VANSCO

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

**B. Starter Batteries**

- i. Manufacturer (DEKA) East Penn Manufacturing Co.
- ii. Model Number 8A8DT978
- iii. Type AGM-8D

**39. Alternator**

- A. Manufacturer EMP
- B. Type Air cooled
- C. Model Number Power 450
- D. Output at Idle 280 Amps
- E. Output at Maximum Speed 455 Amps
- F. Maximum Warranted Speed 6500 rpm
- G. Speed at Idle 2000 rpm
- H. Drive Type Belt

**40. Charge Air Cooler**

- A. Manufacturer EMP
- B. Material (s) Aluminum
- C. Core Area TBD in. x TBD in. = TBD in2.
- D. Number of tubes 15 rows
- E. Tube outer diameter 0.098 major in.
- F. Fins per inch 8.5
- G. Fin thickness 0.003 in.
- H. Fin construction Non-louvered wavy

**41. Chassis and Frame**

- A. Roof Structure Material High tensile steel tube
- B. Roof Anti-Corrosion Material Zinc rich primer
- C. Roof Skin Material Fiberglass
- D. Sidewall Structure Material High tensile steel tube



Procurement of 30-ft, 40-ft and 60-ft Low Floor Diesel Hybrid Coaches

**2A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
40-FT LOW FLOOR DIESEL HYBRID COACHES**

E. Sidewall Anti-Corrosion Material      Zinc rich primer and Corritube

F. Sidewall Skin Material                      Fiberglass

G. Skirt Material                                      Fiberglass

H. Main Bus Structure/Frame Material    High Tensile steel tube and plate

I. Main Bus Structure/Frame Anti-Corrosion Material Zinc rich primer, Coritube & Corishield

**42. Special Tools**

**A. Tools**

**B. Special Test Equipment**



CITY AND COUNTY OF SAN FRANCISCO  
San Francisco Municipal Transportation Agency  
Request for Proposals  
THE PROCUREMENT OF  
30-Foot, 40-FOOT AND 60-FOOT LOW FLOOR  
DIESEL HYBRID COACHES

Proposal Section	Title	Bid Submission Requirements
7	TECHNICAL PROPOSAL WORKSHEET	The Technical Proposal Worksheet, Follow-up Service Worksheet, and Delivery Schedule Worksheet included in Appendix B-Volume 1 RFP shall be completed in their entirety.

XDE60 BAE

3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES

Bus Manufacturer: New Flyer of America Inc.

Bus Model Number: XDE60

1. Dimensions

A. Overall Length

- i. Over Bumpers      60 Feet      10.0 Inches
- ii. Over Body        60 Feet      0 Inches

B. Overall Width

- i. Over Body excluding mirrors and lights      102 Inches
- ii. Over body including mirrors                    132 Inches
- iii. Over tires    102 Inches

C. Overall Height

- i. Excluding Roof-Mounted H&V System      126 Inches
- ii. Including Roof-Mounted H&V System      130 Inches

D. Angle of Approach

9.0 +/-0.5 Degrees

E. Angle of Departure

12.0 +/-0.5 Degrees

F. Breakover Angle

9.0 +/-0.5 Degrees

G. Doorway Clear Opening **With Grab Handles** **No Grab Handles**

	<b>Width</b>	<b>Width</b>	<b>Height</b>
i. Front Door	<u>33.8</u> In.	<u>36.8</u> In.	<u>77.0</u> In.
ii. Center Door	<u>40.9</u> In.	<u>45.2</u> In.	<u>77.3</u> In.
iii. Rear Door	<u>40.9</u> In.	<u>45.2</u> In.	<u>77.3</u> In.

K. Interior Head Room (center of aisle)

- i. First Axle Location                              79.5 Inches
- ii. Second Axle Location                         79.5 Inches
- iii. Third Axle Location                         78 Inches

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

L. Aisle Width		
i. Minimum Width on Floor Between First Axle Wheel Housings		<u>35.5</u> Inches
ii. Minimum Width on Floor Between Second Axle Wheel Housings		<u>25.0</u> Inches
iii. Minimum Width on Floor Between Third Axle Wheel Housings		<u>41.5</u> Inches
iii. Minimum Aisle Width Between Longitudinal Seats		<u>30.6</u> Inches
iv. Minimum Aisle Width Between Transverse Seats		<u>21.75</u> Inches
M. Minimum Ground Clearance		
i. Excluding Axles		<u>10.0</u> Inches
ii. At Axles		<u>5.6</u> Inches
N. Turning Envelope		
i. Outside Body Corner Turning Radius Including Bumper		<u>528</u> Inches
ii. Inside Turning Radius		<u>267.3</u> Inches
O. Wheel Base		
i. First axle to Second axle	<u>229.0</u> Inches	
i. Second axle to third axle	<u>293.0</u> Inches	
P. Track		
i. First axle measured center of tire to center of tire		<u>87.5</u> Inches
ii. Second axle measured center of dual tires to center of dual tires		<u>75</u> Inches
iii. Third axle measured center of dual tires to center of dual tires		<u>75</u> Inches
Q. Overhang, Centerline of Axle Over Bumper		
i. Front		<u>87.3</u> Inches
ii. Rear		<u>120.8</u> Inches
R. Floor		
i. Interior Length	<u>54</u> Feet	<u>5.5</u> Inches
ii. Interior Width	<u>8</u> Feet	<u>0</u> Inches
iii. Height of floor from ground level at front doors		<u>15.5</u> Inches
iv. Height of floor from ground level at center doors		<u>15.5</u> Inches
v. Height of floor from ground level at rear doors		<u>15.5</u> Inches

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

**S. Capacity**

- i. Total Number of Passenger Seats 53
- ii. Total Number of Standing Passengers 61

<b>2. Bus Weight</b>	<b>Curb Weight</b>	<b>Curb Weight plus Seated Load</b>	<b>Curb Weight plus Gross Load (GVWR)</b>
A. First Axle	<u>9,880</u> lbs.	<u>10,867</u> lbs.	<u>12,473</u> lbs.
B. Second Axle	<u>12,220</u> bs.	<u>15,384</u> lbs.	<u>22,220</u> lbs.
B. Third Axle	<u>21,000</u> bs.	<u>24,950</u> lbs.	<u>25,657</u> lbs.
C. Total	<u>43,100</u> lbs.	<u>51,200</u> lbs.	<u>60,350</u> lbs.
E. Weight on the joint (+/-)	<u>TBD</u> lbs.	<u>TBD</u> lbs.	<u>TBD</u> lbs.

**3. Articulation Joint**

- A. Manufacturer ATG
- B. Model Number LIMBO II
- C. Bellow Manufacturer Hubner
- D. Below Material S1
- E. Maximum vertical angle 10 degrees
- F. Maximum lateral angle 52 degrees

**4. Bicycle Rack Provision**

- A. Manufacturer Sportworks
- B. Model TSB quick Release

**5. Paint**

- A. Manufacturer Axalta
- B. Type Imron Elite

**6. Windshield Wipers and Washer**

- A. Manufacturer Sprague
- B. Type Electric
- C. Reservoir Capacity 5 gal.

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

**7. Bumpers**

- A. Manufacturer Romeo Rim
- B. Type 3 piece HELP

**8. Floor**

- A. Subfloor
  - i. Material Thermo-Lite Board Series 2862
  - ii. Thickness 0.750 in.
- B. Floor Covering
  - i. Manufacturer Altro
  - ii. Thickness 2.7mm / 0.11"

**9. Windows**

- A. Passenger Windows
  - i. Manufacturer Arow Global (Stormtite)
  - ii. Number of Windows 17 (including Driver's window)
  - iii. Dimensions of Windows
    - 43.62in. (width) x 42.60 in. (height)
    - 49.31 in. (width) x 42.60 in. (height)
    - 62.28 in. (width) x 42.60 in. (height)
    - 62.28 in. (width) x 35.12 in. (height)
  - iv. Total Window area (Street side) 21,800 sq. in.
  - v. Total Window area (Curb side) 14,900 sq. in.
- B. Rear Window
  - i. Dimensions of Windows N/A in. (width) x N/A in. (height)

**10. Door System**

- A. Manufacturer Vapor
- B. Model
  - i. Front door Slide Glide
  - ii. Center door Slide Glide Activair
  - iii. Rear door Slide Glide Activair
- C. Open/Close Mechanism (air, electric, spring, other)
  - i. Front door air
  - ii. Center door air
  - iii. Rear door air

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

**11. Exterior Lighting**

- A. LED Lights Manufacturer J.W Speaker (headlights) & Dialight
- B. Deceleration Lighting System Manufacturer and Model Number Dialight

**12. Interior Lights**

- A. Manufacturer TCB
- B. Type LED
- C. Model Number LED
- D. Number of Fixtures 16
- E. Size of Fixtures 72 to 96 inches
- F. Power Supplies (Ballasts) Not Applicable to LED

**13. Heating and Ventilating Equipment**

- A. Heating System Capacity 210,000 B.T.U.
- B. Ventilating Capacity 4800 total cfm per passenger
- C. Heater Cores
  - i. Manufacturer & Model Thermo King
  - ii. Number of Rows 2
  - iii. Number of Fins per Inch 9
  - iv. Outer Diameter of Tube 0.375 In.
  - v. Fin Thickness 0.008 In.
  - vi. Number of Heater Cores 2
- D. Heater Blowers
  - i. Manufacturer & Model N/A
  - ii. Horsepower N/A
  - iii. Speed(s) N/A
  - iv. Capacity N/A cfm
- E. Controls
  - i. Manufacturer Thermo King

Procurement of 30-ft, 40-ft and 60-ft Low Floor Diesel Hybrid Coaches

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

ii. Type Microprocessor  
 iii. Model Number IntelligAIRE III  
 F. Heating Equipment Location 0 Above Engine Compt. 2 Roof  
0 Under Floor 0 Other (describe)

**14. Wheelchair Ramp Equipment**

A. Manufacturer New Flyer  
 B. Type Flip-out  
 C. Model Number Gen II  
 D. Capacity 660 lbs.  
 E. Dimensions  
 i. Width of Ramp 32.0 In.  
 ii. Length of Ramp 47.5 In.  
 F. Cycle Times **Normal Idle** **Fast Idle**  
 i. Stowed to Ground 10 Sec. 10 Sec.  
 ii. Ground to Stow 10 Sec. 10 Sec.  
 iii. Total Cycle 20 Sec. 20 Sec.  
 G. Weight of Complete Ramp 130 lbs.

**15. Passenger Seat**

A. Manufacturer American Seating 6468  
 B. Type Cantilever/Pedestal  
 C. Seat Material Stainless Steel  
 D. Seat Insert Material Fiberglass  
 E. Minimum Hip-to-Knee Room 27 in.  
 F. Minimum Foot Room 10.5 in

**16. Destination Signs**

A. Manufacturer  
 B. Size **Rows** **Columns**  
 i. Front Destination Sign 16 112



Procurement of 30-ft, 40-ft and 60-ft Low Floor Diesel Hybrid Coaches

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

ii. Curb Side Destination Sign	<u>9</u>	<u>72</u>
iv. Rear Destination Sign	<u>14</u>	<u>108</u>
v. Dash Mount Run Number Sign	<u>14</u>	<u>40</u>

**17. Voice Annunciation System**

A. Manufacturer	<u>Digital Recorders Inc.</u>
B. Model Number	<u>DR600</u>

**18. Public Address System**

A. Microphone Manufacturer and Model	<u>Digital Recorders / AGC &amp; Sleath</u>
B. Amplifier Manufacturer and Model	<u>DRI Stealth MIC processor Type 1</u>
C. Number of Speaker(s)	<b>Inside</b>
	<b>Outside</b>
	<u>8</u>
	<u>1</u>

**19. Surveillance Camera System**

A. Manufacturer	<u>Kratos</u>
B. Number of Cameras	<u>11</u>
C. Digital Disk Storage Capacity	<u>72 hr. minimum</u>

**20. Automatic Passenger Counter**

A. Manufacturer	<u>UTA</u>
B. Model Number	<u>Smart Sensor</u>

**21. Driver's Area**

A. Steering Wheel	
i. Manufacturer	<u>Vehicle Improvement Products</u>
ii. Model Number	<u>BKBL1824D4V</u>
iii. Size	<u>18.00 diameter</u>
B. Operator's Seat	
i. Manufacturer	<u>USSC</u>
ii. Model Number	<u>9100</u>

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

**C. Driver Heater/Defroster**

- i. Manufacturer Mobile Climate Control
- ii. Type 24 V Litton Motor
- iii. Model Number 12-60020
- iv. Capacity 84,000 B.T.U.
- v. Blower Speed(s) 3 speeds

**D. Windshield**

- i. Dimensions (Length x Height) 49(per side) in. x 42 in.
- ii. Number of Sections 2
- iii. Material Laminate glass
- iv. Thickness 0.232 to 0.260 Inches

**E. Driver's Side Window**

- i. Dimensions (Length x Height) 42.16 in. x 41.78 in.
- ii. Number of Sections 2
- iii. Material Laminated Glass
- iv. Thickness 6 mm

**F. Side Mirrors**

- |                     | <b>Curb Side</b>        | <b>Street Side</b>      |
|---------------------|-------------------------|-------------------------|
| i. Manufacturer(s)  | <u>Lucerix</u>          | <u>Lucerix</u>          |
| ii. Model Number(s) | <u>32.602.00-01-12V</u> | <u>31.757.00-01-12V</u> |

**G. Storage Locker**

- i. Number of Lockers 2
- ii. Size 10.5 + 11.7 Cu. Ft.
- iii. Location Above Driver and behind Driver's Seat

**22. Engine**

- A. Manufacturer Cummins
- B. Type 2013 Diesel
- C. Model Number ISL9 330
- D. Number of Cylinders 6 (six)
- E. Bore 4.49 In.
- F. Stroke 5.69 In.

3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES

G. Displacement Cu. 543 In.  
H. Compression Ratio 16.6:1  
I. Injector Size & Type Bosch Closed Nozzle  
J. Power 330 HP 246 ( kW) 2200 at rpm  
K. Peak Torque 1100 lb. ft. 1491 ( Nm) 1300 at rpm  
L. Engine Speed at **Idle** **Fast Idle** **Governed**  
750 rpm 1000 rpm 2,800 rpm  
M. Dry Weight 1,695 lbs.  
N. Crankcase Oil Capacity  
i. New Engine, Dry 6.3 Gals.

ii. New Engine, Wet 6.3 gals.

O. Turbo Charger

i. Manufacturer Holset  
ii. Type HX40  
iii. Maximum rpm, not at load 2,800 rpm  
iv. Maximum rpm, at full load 2,400 rpm

23. Cooling System

A. Radiator

i. Manufacturer EMP  
ii. Type Aluminum Bar-Plate  
iii. Model Number XPL1  
iv. Core Area TBD in. x TBD in. = TBD in<sup>2</sup>  
v. Number of Tubes 37rows (radiator) 15 rows (CAC)  
vi. Tube Outer Diameter 0.098 major In.  
vii. Fins per Inch 8.5  
viii. Fin Thickness 0.003 In.  
ix. Fin Construction Non-louvered wavy

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

B. Total Cooling System Capacity	<u>23</u> gals.
C. Radiator Fan Speed Control Type	<u>Electronic</u>
D. Surge Tank Capacity	<u>5</u> gals
E. Surge Tank Material	<u>Stainless Steel</u>
F. Engine Thermostat Temperature Settings Degrees	<u>200</u> F
G. Overheat Alarm Temperature Sending Unit Settings Degrees	<u>225</u> F
H. Maximum Ambient Operating Temperature Degree	<u>235</u> F

**24. Propulsion Generator**

A. Manufacturer	<u>BAE</u>
B. Type	<u>In-line drive</u>
C. Size	<u>6 in. x 23.6 in. x 23.6 in.</u>
D. Weight, Complete	<u>855</u> lbs.
E. Power Output	<u>230 kW (308 hp) @ 2000rpm</u>

**25. Traction Motor**

A. Manufacturer	<u>BAE</u>
B. Type	<u>Series Hybrid Drive</u>
C. Model Number	<u>HDS300</u>
F. Oil Capacity (including heat exchanger)	<u>3</u> gal.

**26. Energy Storage**

A. Manufacturer	<u>BAE</u>
B. Type	<u>Nano-iron-phosphate</u>
C. Size	<u>230 kW peak</u>
D. Weight, Complete	<u>800</u> lbs.
E. Power Output	<u>635 Vdc nominal</u>
F. Cooling Requirement	<u>Ambient air-cooled</u>

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

**27. Energy Storage Controller**

A. Manufacturer BAE

**28. Propulsion Control System**

A. Manufacturer BAE

B. Cooling Media water ethylene/glycol (or propylene glycol)

C. Cooling Requirements 15gpm (57 lpm)

**29. Axle**

A. First Axle

- i. Manufacturer & Model Number MAN VOK-07-F
- ii. Type Reverse Elliot cast beam, dropped center, non-driven
- iii. Rating 15,873 lbs

B. Second Axle

- i. Manufacturer & Model Number ZF AVN 132
- ii. Type Non-driven
- iii. Rating 25,350 lbs

C. Third Axle

- i. Manufacturer & Model Number MAN HY-1350-F
- ii. Type Single Reduction
- iii. Rating 28,660 lbs

B. Drive Axle Ratio

- i. Differential Ratio 4.56:1
- ii. Hub Reduction Ratio (if used) N/A
- iii. Final Axle Ratio (if hub reduction is used) 4.56:1

**30. Suspension**

A. Air Bags

- i. Manufacturer Firestone
- ii. Number of Air Bag per Wheel 2 Front      4 Rear
- iii. Total Air Bag Volume TBD Cu. In.      TBD Cu. In.

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

**B. Shock Absorbers**

i. Manufacturer

Koni

ii. Type

double-acting, telescoping type

iii. Number of Shock per Wheel

2 Front

4 Rear

**31. Brake System**

A. Fundamental System Manufacturer

Knorr

B. First Axle Brake Actuator Model  
and Part Number

MGM/ 1621705, 1621706

C. Second Axle Brake Actuator Model  
and Part Number

ZF/ 0501329539

D. Third Axle Brake Actuator Model  
and Part Number

MGM/ MJB2024ET752

E. First Axle Brake Rotor

i. Manufacturer

MAN

ii. Part Number

81.50803.0040

iii. Diameter

16.14

iv. Width

TBD In.

F. Second Axle Brake Disc

i. Manufacturer

MAN

ii. Part Number

81.50803.0041

iii. Diameter

16.14 In.

iv. Width

TBD In.

G. Third Axle Brake Disc

i. Manufacturer

MAN

ii. Part Number

81.50803.0041

iii. Diameter

16.14 In.

iv. Width

TBD In.

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

H. Brake Pad Manufacturer	<u>Ferrodo</u>	
I. First Axle Brake Pad Identification		
i. Forward	<u>81.50820.5104</u>	
ii. Reverse	<u>81.50820.5104</u>	
J. Second Axle Brake Pad Identification		
i. Forward	<u>81.50820.5104</u>	
ii. Reverse	<u>81.50820.5104</u>	
K. Third Axle Brake Pad Identification		
i. Forward	<u>81.50820.5104</u>	
ii. Reverse	<u>81.50820.5104</u>	
I. Brake Pads	<u>2 pads/caliper, 4 pads per axles</u>	
J. Brake Pad Size	<b>Length</b>	<b>Width</b>
i. First Axle	<u>7.09 In.</u>	<u>TBD In.</u>
ii. Drive Axle	<u>7.09 In.</u>	<u>TBD In.</u>
K. Pad Thickness	<u>0.827 In.</u>	
L. Pad Area per Wheel		
i. First Axle	<u>30.38 Sq. In.</u>	
ii. Second Axle	<u>30.38 Sq. In.</u>	
ii. Drive Axle	<u>30.38 Sq. In.</u>	
M. Anti-Lock Brake System Manufacturer	<u>WABCO</u>	

**32. Air System**

A. Air Compressor	
i. Manufacturer	<u>Powerex</u>
ii. Type	<u>Scroll</u>
iii. Model Number	<u>SLAEOSE-HP</u>
iv. Capacity at Idle	<u>13.5 cfm</u>
v. Capacity at Maximum Speed	<u>13.5 cfm</u>
vi. Maximum Warranted Speed	<u>TBD rpm</u>
vii. Idle Speed	<u>TBD rpm</u>
viii. Drive Type	<u>Belt to electric motor</u>

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

- B. Air Reservoir Capacity
  - i. Supply Reservoir 1200/800 split Cu. In.
  - ii. Primary Reservoir 2000 Cu. In.
  - iii. Secondary Reservoir 2000 Cu. In.
  - iv. Parking Reservoir 2000 Cu. In.
  - v. Accessory Reservoir 2150/1400 split Cu. In.
  - vi. Other Reservoir 2000 Cu. In.
- C. Air Dryer
  - i. Manufacturer Graham White
  - ii. Model Number SludgeBreaker QBA60NX5

**33. Fuel System**

- A. Fuel Tank
  - i. Manufacturer New Flyer
  - ii. Size 100 usable Gallons
  - iii. Material Cross-linked polyethylene
- B. Filler
  - i. Manufacturer EMCO Wheaten
  - ii. Model Number Posi-snap

**34. Hydraulic System**

- A. Fan Drive
  - i. Manufacturer N/A, electric Radiator
  - ii. Type N/A, electric Radiator
  - iii. Model Number N/A, electric Radiator
- B. Power Steering
  - i. Steering Gear Manufacturer Sheppard
  - ii. Type M110
  - iii. Relief Pressure 2175 psi
  - iv. Power Steering Fluid Capacity 20 qts.
  - v. Effort at Steering Wheel  
(Unloaded stationary coach  
on dry asphalt pavement) 9 lbs. to 10 degrees



**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

**35. Wheels**

- A. Manufacturer Accuride
- B. Type Aluminum
- C. Size 22.5" x 8.25"
- D. Mounting Hub Piloted

**36. Tires**

- A. Manufacturer Customer Supplied Firestone
- B. Type Low Profile
- C. Size 305/70R22.5
- D. Load Range Depends on tire manufacturer
- E. Inflation Pressure 1st Axle Depends on tire manufacturer p.s.i. Drive Axle Depends on tire manufacturer p.s.i.

**37. Starter**

- A. Manufacturer N/A
- B. Model Number N/A
- C. Tank volume N/A

**38. Fire Detection/Suppression System**

- A. Manufacturer Amerex
- B. Model Number SafetyNet
- C. Dry Chemical Tank Capacity 25 lbs.
- D. Expellant Gas Tank Capacity Not Applicable

**39. Chassis Electrical**

- A. Multiplex System
  - i. Manufacturer Parker VANSCO
  - ii. Model Number Parker VANSCO
- B. Starter Batteries
  - i. Manufacturer (DEKA) East Penn Manufacturing Co.

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

ii. Model Number 8A8DT978  
iii. Type AGM-8D

**40. Alternator**

A. Manufacturer BAE  
B. Type Beltless (Auxiliary power from ESS)  
C. Model Number APS-2  
D. Output at Idle 545 Amps  
E. Output at Maximum Speed 545 Amps  
F. Maximum Warranted Speed N/A Beltless rpm  
G. Speed at Idle N/A Beltless rpm  
H. Drive Type Beltless (Auxiliary power from ESS)

**41. Charge Air Cooler**

A. Manufacturer EMP  
B. Material (s) Aluminum  
C. Core Area TBD in. x TBD in. = TBD in<sup>2</sup>.  
D. Number of tubes 15 rows  
E. Tube outer diameter 0.098 major in.  
F. Fins per inch 8.5  
G. Fin thickness 0.003 in.  
H. Fin construction Non-louvered wavy

**42. Chassis and Frame**

A. Roof Structure Material High tensile steel tube  
B. Roof Anti-Corrosion Material Zinc rich primer  
C. Roof Skin Material Fiberglass  
D. Sidewall Structure Material High tensile steel tube  
E. Sidewall Anti-Corrosion Material Zinc rich primer and Corritube  
F. Sidewall Skin Material Fiberglass  
G. Skirt Material Fiberglass

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

H. Main Bus Structure/Frame Material High Tensile steel tube and plate

I. Main Bus Structure/Frame Anti-Corrosion Material Zinc rich primer, Coritube & Corishield

**43. Special Tools**

**A. Tools**

**B. Special Test Equipment**



CITY AND COUNTY OF SAN FRANCISCO  
San Francisco Municipal Transportation Agency  
Request for Proposals  
THE PROCUREMENT OF  
30-Foot, 40-FOOT AND 60-FOOT LOW FLOOR  
DIESEL HYBRID COACHES

Proposal Section	Title	Bid Submission Requirements
7	TECHNICAL PROPOSAL WORKSHEET	The Technical Proposal Worksheet, Follow-up Service Worksheet, and Delivery Schedule Worksheet included in Appendix B-Volume 1 RFP shall be completed in their entirety.

XDE60 Allison

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

Bus Manufacturer: New Flyer of America Inc.

Bus Model Number: XDE60

**1. Dimensions**

A. Overall Length

- i. Over Bumpers      60 Feet      10.0 Inches
- ii. Over Body        60 Feet      0 Inches

B. Overall Width

- i. Over Body excluding mirrors and lights    102 Inches
- ii. Over body including mirrors                132 Inches
- iii. Over tires                                        102 Inches

C. Overall Height

- i. Excluding Roof-Mounted H&V System    126 Inches
- ii. Including Roof-Mounted H&V System    130 Inches

D. Angle of Approach

9.0 +/-0.5 Degrees

E. Angle of Departure

12.0 +/-0.5 Degrees

F. Breakover Angle

9.0 +/-0.5 Degrees

G. Doorway Clear Opening **With Grab Handles** **No Grab Handles**

	<b>Width</b>	<b>Width</b>	<b>Height</b>
i. Front Door	<u>33.8</u> In.	<u>36.8</u> In.	<u>77.0</u> In.
ii. Center Door	<u>40.9</u> In.	<u>45.2</u> In.	<u>77.3</u> In.
iii. Rear Door	<u>40.9</u> In.	<u>45.2</u> In.	<u>77.3</u> In.

K. Interior Head Room (center of aisle)

- i. First Axle Location                            79.5 Inches
- ii. Second Axle Location                        79.5 Inches
- iii. Third Axle Location                         78 Inches

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

L. Aisle Width

- i. Minimum Width on Floor Between First Axle Wheel Housings 35.5 Inches
- ii. Minimum Width on Floor Between Second Axle Wheel Housings 25.0 Inches
- iii. Minimum Width on Floor Between Third Axle Wheel Housings 41.5 Inches
- iii. Minimum Aisle Width Between Longitudinal Seats 30.6 Inches
- iv. Minimum Aisle Width Between Transverse Seats 21.75 Inches

M. Minimum Ground Clearance

- i. Excluding Axles 10.0 Inches
- ii. At Axles 5.6 Inches

N. Turning Envelope

- i. Outside Body Corner Turning Radius Including Bumper 528 Inches
- ii. Inside Turning Radius 267.3 Inches

O. Wheel Base

- i. First axle to Second axle 229.0 Inches
- i. Second axle to third axle 293.0 Inches

P. Track

- i. First axle measured center of tire to center of tire 87.5 Inches
- ii. Second axle measured center of dual tires to center of dual tires 75 Inches
- iii. Third axle measured center of dual tires to center of dual tires 75 Inches

Q. Overhang, Centerline of Axle Over Bumper

- i. Front 87.3 Inches
- ii. Rear 120.8 Inches

R. Floor

- i. Interior Length 54 Feet 5.5 Inches
- ii. Interior Width 8 Feet 0 Inches
- iii. Height of floor from ground level at front doors 15.5 Inches
- iv. Height of floor from ground level at center doors 15.5 Inches
- v. Height of floor from ground level at rear doors 15.5 Inches

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

**S. Capacity**

- i. Total Number of Passenger Seats 53
- ii. Total Number of Standing Passengers 61

<b>2. Bus Weight</b>	<b>Curb Weight</b>	<b>Curb Weight plus Seated Load</b>	<b>Curb Weight plus Gross Load (GVWR)</b>
A. First Axle	<u>9,880 lbs.</u>	<u>10,867 lbs.</u>	<u>12,473 lbs.</u>
B. Second Axle	<u>12,220 lbs.</u>	<u>15,384 lbs.</u>	<u>22,220 lbs.</u>
B. Third Axle	<u>21,000 lbs.</u>	<u>24,950 lbs.</u>	<u>25,657 lbs.</u>
C. Total	<u>43,100 lbs.</u>	<u>51,200 lbs.</u>	<u>60,350 lbs.</u>
E. Weight on the joint (+/-)	<u>TBD lbs.</u>	<u>TBD lbs.</u>	<u>TBD lbs.</u>

**3. Articulation Joint**

- A. Manufacturer ATG
- B. Model Number LIMBO II
- C. Bellow Manufacturer Hubner
- D. Below Material S1
- E. Maximum vertical angle 10 degrees
- F. Maximum lateral angle 52 degrees

**4. Bicycle Rack Provision**

- A. Manufacturer Sportworks
- B. Model TSB quick Release

**5. Paint**

- A. Manufacturer Axalta
- B. Type Imron Elite

**6. Windshield Wipers and Washer**

- A. Manufacturer Sprague
- B. Type Electric
- C. Reservoir Capacity 5 gal.

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

**7. Bumpers**

- A. Manufacturer Romeo Rim
- B. Type 3 piece HELP

**8. Floor**

- A. Subfloor
  - i. Material Thermo-Lite Board Series 2862
  - ii. Thickness 0.750 in.
- B. Floor Covering
  - i. Manufacturer Altro
  - ii. Thickness 2.7mm / 0.11"

**9. Windows**

- A. Passenger Windows
  - i. Manufacturer Arow Global (Stormtite)
  - ii. Number of Windows 17 (including Driver's window)
  - iii. Dimensions of Windows
    - 43.62in. (width) x 42.60 in. (height)
    - 49.31 in. (width) x 42.60 in. (height)
    - 62.28 in. (width) x 42.60 in. (height)
    - 62.28 in. (width) x 35.12 in. (height)
  - iv. Total Window area (Street side) 21,800 sq. in.
  - v. Total Window area (Curb side) 14,900 sq. in.
- B. Rear Window
  - i. Dimensions of Windows N/A in. (width) x N/A in. (height)

**10. Door System**

- A. Manufacturer Vapor
- B. Model
  - i. Front door Slide Glide
  - ii. Center door Slide Glide Activair
  - iii. Rear door Slide Glide Activair
- C. Open/Close Mechanism (air, electric, spring, other)
  - i. Front door air
  - ii. Center door air
  - iii. Rear door air



**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

**11. Exterior Lighting**

A. LED Lights Manufacturer	<u>J.W Speaker (headlights) &amp; Dialight</u>
B. Deceleration Lighting System Manufacturer and Model Number	<u>Dialight</u>

**12. Interior Lights**

A. Manufacturer	<u>TCB</u>
B. Type	<u>LED</u>
C. Model Number	<u>LED</u>
D. Number of Fixtures	<u>16</u>
E. Size of Fixtures	<u>72 to 96 inches</u>
F. Power Supplies (Ballasts)	<u>Not Applicable to LED</u>

**13. Heating and Ventilating Equipment**

A. Heating System Capacity	<u>210,000 B.T.U.</u>
B. Ventilating Capacity	<u>4800 total cfm per passenger</u>
C. Heater Cores	
i. Manufacturer & Model	<u>Thermo King</u>
ii. Number of Rows	<u>2</u>
iii. Number of Fins per Inch	<u>9</u>
iv. Outer Diameter of Tube	<u>0.375 In.</u>
v. Fin Thickness	<u>0.008 In.</u>
vi. Number of Heater Cores	<u>2</u>
D. Heater Blowers	
i. Manufacturer & Model	<u>N/A</u>
ii. Horsepower	<u>N/A</u>
iii. Speed(s)	<u>N/A</u>
iv. Capacity	<u>N/A cfm</u>
E. Controls	
i. Manufacturer	<u>Thermo King</u>

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

ii. Type Microprocessor  
 iii. Model Number IntelligAIRE III  
 F. Heating Equipment Location 0 Above Engine Compt. 2 Roof  
0 Under Floor 0 Other (describe)

**14. Wheelchair Ramp Equipment**

A. Manufacturer New Flyer  
 B. Type Flip-out  
 C. Model Number Gen II  
 D. Capacity 660 lbs.  
 E. Dimensions  
 i. Width of Ramp 32.0 In.  
 ii. Length of Ramp 47.5 In.  
 F. Cycle Times **Normal Idle** **Fast Idle**  
 i. Stowed to Ground 10 Sec. 10 Sec.  
 ii. Ground to Stow 10 Sec. 10 Sec.  
 iii. Total Cycle 20 Sec. 20 Sec.  
 G. Weight of Complete Ramp 130 lbs.

**15. Passenger Seat**

A. Manufacturer American Seating 6468  
 B. Type Cantilever/Pedestal  
 C. Seat Material Stainless Steel  
 D. Seat Insert Material Fiberglass  
 E. Minimum Hip-to-Knee Room 27 in.  
 F. Minimum Foot Room 10.5 in

**16. Destination Signs**

A. Manufacturer  
 B. Size **Rows** **Columns**  
 i. Front Destination Sign 16 112

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

ii. Curb Side Destination Sign	<u>9</u>	<u>72</u>
iv. Rear Destination Sign	<u>14</u>	<u>108</u>
v. Dash Mount Run Number Sign	<u>14</u>	<u>40</u>

**17. Voice Annunciation System**

A. Manufacturer Digital Recorders Inc.  
 B. Model Number DR600

**18. Public Address System**

A. Microphone Manufacturer and Model Digital Recorders / AGC & Sleath  
 B. Amplifier Manufacturer and Model DRI Stealth MIC processor Type 1  
 C. Number of Speaker(s) **Inside** 8 **Outside** 1

**19. Surveillance Camera System**

A. Manufacturer Kratos  
 B. Number of Cameras 11  
 C. Digital Disk Storage Capacity 72 hr. minimum

**20. Automatic Passenger Counter**

A. Manufacturer UTA  
 B. Model Number Smart Sensor

**21. Driver's Area**

A. Steering Wheel  
 i. Manufacturer Vehicle Improvement Products  
 ii. Model Number BKBL1824D4V  
 iii. Size 18 in. diameter  
 B. Operator's Seat  
 i. Manufacturer USSC  
 ii. Model Number 9100

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

C. Driver Heater/Defroster

- i. Manufacturer Mobile Climate Control
- ii. Type 24 V Litton Motor
- iii. Model Number 12-60020
- iv. Capacity 84,000 B.T.U.
- v. Blower Speed(s) 3 speeds

D. Windshield

- i. Dimensions (Length x Height) 49(per side) in. x 42 in.
- ii. Number of Sections 2
- iii. Material Laminate glass
- iv. Thickness 0.232 to 0.260 Inches

E. Driver's Side Window

- i. Dimensions (Length x Height) 42.16 in. x 41.78 in.
- ii. Number of Sections 2
- iii. Material Laminated Glass
- iv. Thickness 6 mm

F. Side Mirrors

- |                     | <b>Curb Side</b>        | <b>Street Side</b>      |
|---------------------|-------------------------|-------------------------|
| i. Manufacturer(s)  | <u>Lucerix</u>          | <u>Lucerix</u>          |
| ii. Model Number(s) | <u>32.602.00-01-12V</u> | <u>31.757.00-01-12V</u> |

G. Storage Locker

- i. Number of Lockers 2
- ii. Size 10.5 + 11.7 Cu. Ft.
- iii. Location Above Driver and behind Driver's Seat

**22. Engine**

- A. Manufacturer Cummins
- B. Type 2013 Diesel
- C. Model Number ISL9 330
- D. Number of Cylinders 6 (six)
- E. Bore 4.49 In.
- F. Stroke 5.69 In.

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

G. Displacement Cu.	<u>543</u> In.		
H. Compression Ratio	<u>16.6:1</u>		
I. Injector Size & Type	<u>Bosch Closed Nozzle</u>		
J. Power	<u>330</u> HP	<u>246</u> ( kW)	<u>2200</u> at rpm
K. Peak Torque	<u>1100</u> lb. ft.	<u>1491</u> ( Nm)	<u>1300</u> at rpm
L. Engine Speed at	<b>Idle</b>	<b>Fast Idle</b>	<b>Governed</b>
	<u>750</u> rpm	<u>1000</u> rpm	<u>2,800</u> rpm
M. Dry Weight	<u>1,695</u> lbs.		
N. Crankcase Oil Capacity			
i. New Engine, Dry		<u>6.3</u> Gals.	
ii. New Engine, Wet		<u>6.3</u> Gals.	
O. Turbo Charger			
i. Manufacturer		<u>Holset</u>	
ii. Type		<u>HX40</u>	
iii. Maximum rpm, not at load		<u>2,800</u> rpm	
iv. Maximum rpm, at full load		<u>2,400</u> rpm	

**23. Cooling System**

A. Radiator	
i. Manufacturer	<u>EMP</u>
ii. Type	<u>Aluminum Bar-Plate</u>
iii. Model Number	<u>XPL2</u>
iv. Core Area	<u>TBD</u> in. x <u>TBD</u> in. = <u>TBD</u> in <sup>2</sup>
v. Number of Tubes	<u>37rows (radiator) 15 rows (CAC)</u>
vi. Tube Outer Diameter	<u>0.098</u> major In.
vii. Fins per Inch	<u>8.5</u>
viii. Fin Thickness	<u>0.003</u> In.
ix. Fin Construction	<u>Non-louvered wavy</u>

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

- B. Total Cooling System Capacity 23 gals.
- C. Radiator Fan Speed Control Type Electronic
- D. Surge Tank Capacity 5 gals
- E. Surge Tank Material Stainless Steel
- F. Engine Thermostat Temperature Settings Degrees 200 F
- G. Overheat Alarm Temperature Sending Unit Settings Degrees 225 F
- H. Maximum Ambient Operating Temperature Degree 235 F

**24. Propulsion Generator**

- A. Manufacturer Allison
- B. Type In-line drive
- C. Size 33 in. x 25 in. x 21 in.
- D. Weight, Complete 944 lbs.
- E. Power Output 246 kW (330 hp) @ 2300rpm

**25. Traction Motor**

- A. Manufacturer Allison
- B. Type Parallel Hybrid Drive
- C. Model Number H 50EP(Ev50)
- F. Oil Capacity (including heat exchanger) 13 gal.

**26. Energy Storage**

- A. Manufacturer Allison
- B. Type Nickel Metal Hydride
- C. Size 11.14 in. x 85.96 in. x 45.21 in.
- D. Weight, Complete 970 lbs.
- E. Power Output 432-780 Volts
- F. Cooling Requirement 2 kW Freon Evaporator

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

**27. Energy Storage Controller**

A. Manufacturer Allison

**28. Propulsion Control System**

A. Manufacturer Allison

B. Cooling Media N/A

C. Cooling Requirements N/A

**29. Axle**

A. First Axle

- i. Manufacturer & Model Number MAN VOK-07-F
- ii. Type Reverse Elliot cast beam, dropped center, non-driven
- iii. Rating 15,873 lbs

B. Second Axle

- i. Manufacturer & Model Number ZF AVN 132
- ii. Type Non-driven
- iii. Rating 25,350 lbs

C. Third Axle

- i. Manufacturer & Model Number MAN HY-1350-F
- ii. Type Single Reduction
- iii. Rating 28,660 lbs

B. Drive Axle Ratio

- i. Differential Ratio 4.56:1
- ii. Hub Reduction Ratio (if used) N/A
- iii. Final Axle Ratio (if hub reduction is used) 4.56:1

**30. Suspension**

A. Air Bags

- i. Manufacturer Firestone
- ii. Number of Air Bag per Wheel 2 Front      4 Rear
- iii. Total Air Bag Volume TBD Cu. In.      TBD Cu. In.

Procurement of 30-ft, 40-ft and 60-ft Low Floor Diesel Hybrid Coaches

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

**B. Shock Absorbers**

i. Manufacturer

Koni

ii. Type

double-acting, telescoping type

iii. Number of Shock per Wheel

2 Front

4 Rear

**31. Brake System**

A. Fundamental System Manufacturer

Knorr

B. First Axle Brake Actuator Model  
and Part Number

MGM/ 1621705, 1621706

C. Second Axle Brake Actuator Model  
and Part Number

ZF/ 0501329539

D. Third Axle Brake Actuator Model  
and Part Number

MGM/ MJB2024ET752

E. First Axle Brake Rotor

i. Manufacturer

MAN

ii. Part Number

81.50803.0040

iii. Diameter

16.14

iv. Width

TBD In.

F. Second Axle Brake Disc

i. Manufacturer

MAN

ii. Part Number

81.50803.0041

iii. Diameter

16.14 In.

iv. Width

TBD In.

G. Third Axle Brake Disc

i. Manufacturer

MAN

ii. Part Number

81.50803.0041

iii. Diameter

16.14 In.

iv. Width

TBD In.



**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

H. Brake Pad Manufacturer	<u>Ferodo</u>	
I. First Axle Brake Pad Identification		
i. Forward	<u>81.50820.5104</u>	
ii. Reverse	<u>81.50820.5104</u>	
J. Second Axle Brake Pad Identification		
i. Forward	<u>81.50820.5104</u>	
ii. Reverse	<u>81.50820.5104</u>	
K. Third Axle Brake Pad Identification		
i. Forward	<u>81.50820.5104</u>	
ii. Reverse	<u>81.50820.5104</u>	
L. Brake Pads	<u>2 pads/caliper, 4 pads per axles</u>	
J. Brake Pad Size	<b>Length</b>	<b>Width</b>
i. First Axle	<u>7.09 In.</u>	<u>TBD In.</u>
ii. Drive Axle	<u>7.09 In.</u>	<u>TBD In.</u>
K. Pad Thickness	<u>0.827 In.</u>	
L. Pad Area per Wheel		
i. First Axle	<u>30.38 Sq. In.</u>	
ii. Second Axle	<u>30.38 Sq. In.</u>	
ii. Drive Axle	<u>30.38 Sq. In.</u>	
M. Anti-Lock Brake System Manufacturer	<u>WABCO</u>	

**32. Air System**

A. Air Compressor	
i. Manufacturer	<u>WABCO</u>
ii. Type	<u>Twin Cylinder</u>
iii. Model Number	<u>HD 30.4</u>
iv. Capacity at Idle	<u>6.9 cfm</u>
v. Capacity at Maximum Speed	<u>30.4 cfm</u>
vi. Maximum Warranted Speed	<u>3000 rpm</u>
vii. Idle Speed	<u>750 rpm</u>
viii. Drive Type	<u>Direct</u>

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

- B. Air Reservoir Capacity
  - i. Supply Reservoir 1200/800 split Cu. In.
  - ii. Primary Reservoir 2000 Cu. In.
  - iii. Secondary Reservoir 2000 Cu. In.
  - iv. Parking Reservoir 2000 Cu. In.
  - v. Accessory Reservoir 2150/1400 split Cu. In.
  - vi. Other Reservoir 2000 Cu. In.
- C. Air Dryer
  - i. Manufacturer Graham White
  - ii. Model Number SludgeBreaker QBA60NX5

**33. Fuel System**

- A. Fuel Tank
  - i. Manufacturer New Flyer
  - ii. Size 100 usable Gallons
  - iii. Material Cross-linked polyethylene
- B. Filler
  - i. Manufacturer EMCO Wheaten
  - ii. Model Number Posi-snap

**34. Hydraulic System**

- A. Fan Drive
  - i. Manufacturer N/A, electric Radiator
  - ii. Type N/A, electric Radiator
  - iii. Model Number N/A, electric Radiator
- B. Power Steering
  - i. Steering Gear Manufacturer Sheppard
  - ii. Type M110
  - iii. Relief Pressure 2175 psi
  - iv. Power Steering Fluid Capacity 20 qts.
  - v. Effort at Steering Wheel  
(Unloaded stationary coach  
on dry asphalt pavement) 9 lbs. to 10 degrees

**3A. TECHNICAL PROPOSAL WORKSHEET  
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**35. Wheels**

- A. Manufacturer Accuride
- B. Type Aluminum
- C. Size 22.5" x 8.25"
- D. Mounting Hub Piloted

**36. Tires**

- A. Manufacturer Customer Supplied Firestone
- B. Type Low Profile
- C. Size 305/70R22.5
- D. Load Range Depends on tire manufacturer
- E. Inflation Pressure 1st Axle Depends on tire manufacturer p.s.i. Drive Axle Depends on tire manufacturer p.s.i.

**37. Starter**

- A. Manufacturer N/A
- B. Model Number N/A
- C. Tank volume N/A

**38. Fire Detection/Suppression System**

- A. Manufacturer Amerex
- B. Model Number SafetyNet
- C. Dry Chemical Tank Capacity 25 lbs.
- D. Expellant Gas Tank Capacity Not Applicable

**39. Chassis Electrical**

- A. Multiplex System
  - i. Manufacturer Parker VANSCO
  - ii. Model Number Parker VANSCO
- B. Starter Batteries
  - i. Manufacturer (DEKA) East Penn Manufacturing Co.

**3A. TECHNICAL PROPOSAL WORKSHEET  
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ii. Model Number 8A8DT978  
iii. Type AGM-8D

**40. Alternator**

A. Manufacturer EMP  
B. Type Air cooled  
C. Model Number Power 450  
D. Output at Idle 280 Amps  
E. Output at Maximum Speed 455 Amps  
F. Maximum Warranted Speed 6500 rpm  
G. Speed at Idle 2000 rpm  
H. Drive Type Belt

**41. Charge Air Cooler**

A. Manufacturer EMP  
B. Material (s) Aluminum  
C. Core Area TBD in. x TBD in. = TBD in2.  
D. Number of tubes 15 rows  
E. Tube outer diameter 0.098 major in.  
F. Fins per inch 8.5  
G. Fin thickness 0.003 in.  
H. Fin construction Non-louvered wavy

**42. Chassis and Frame**

A. Roof Structure Material High tensile steel tube  
B. Roof Anti-Corrosion Material Zinc rich primer  
C. Roof Skin Material Fiberglass  
D. Sidewall Structure Material High tensile steel tube  
E. Sidewall Anti-Corrosion Material Zinc rich primer and Corritube  
F. Sidewall Skin Material Fiberglass  
G. Skirt Material Fiberglass

Procurement of 30-ft, 40-ft and 60-ft Low Floor Diesel Hybrid Coaches

**3A. TECHNICAL PROPOSAL WORKSHEET  
FOR  
60-FT LOW FLOOR DIESEL HYBRID COACHES**

H. Main Bus Structure/Frame Material High Tensile steel tube and plate

I. Main Bus Structure/Frame Anti-Corrosion Material Zinc rich primer, Coritube & Corishield

**43. Special Tools**

**A. Tools**

**B. Special Test Equipment**