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
3-C	Overall Vehicle Requirements	1) Provide information on how the vehicle will be compliant with California Code of Regulations, Title 13, Section 1956.1 at the time of delivery to SFMTA. 2) Discuss design features that address the issue of wheelchair access in general. 3) What steps have been taken to keep the weight on the axles as low as possible? 4) Provide information on the weight distribution between the front and rear axles. 5) How are reflections in the windshield effectively eliminated for the driver? The explanation must include detailed information on interior reflections, night glare etc. 6) Discuss measures taken to minimize interior and exterior noise; note specific measures used to quiet the engine, motor, and other propulsion sub-systems; if the bus will be noticeably quieter than specified, supply test results on a nearly identical bus and the testing procedures for evaluation by SFMTA. 7) Provide data on the expected sound level in the passenger area when bus is operating including noise from ventilating fans. 8) CARB certification – Proof or plan. 9) Wheelchair Ramp.

Compliance with the California Code of Regulations, Title 13, Section 1956 is attained through the California Air Resources Board's Executive Order. The Executive Order is a certification process that is undertaken by our engine manufacturer (Cummins Inc.) for each model year and in our experience using this engine manufacturer, no delays were ever experienced with regards to deliveries of New Flyer buses into the State of California.
As SFMTA is aware, due to OBD-II (On-Board Diagnostics) requirements that were implemented at the beginning of 2014, currently an Executive Order is not attainable for new Hybrid Urban Transit Buses in the State of California. However, with strong support from the California Transit Association, a "Hybrid Task Force" was created which included representation from all Heavy Duty Transit Bus Manufacturers, Cummins, Allison, BAE and a number of potentially effected Transit Agencies across California (including SFMTA representation) contributed to discussions and meetings with CARB over the past year. The Task Force made great strides working with CARB to find an amicable solution. In the recent weeks, it is becoming evident that CARB has made agreements to allow a joint certification plan. At the time of this submittal, the details have not yet been released to the Task Force, however we have been informed that this joint certification path will be allowed and the engine supplier and hybrid suppliers will be able to meet their requirements to achieve the Executive Order(s).

Bus Weight: With New Flyer's leading experience in Heavy Duty Transit Bus manufacturing, we have closely monitored the fact that vehicles continued to get heavier whether due to new emissions

compliance, enhanced ADA accommodations or other technologies such as CAD / AVL. Recognizing this, New Flyer understood that we needed to reduce the weight of the vehicle elsewhere, which we did. When New Flyer first began development of the Xcelsior platform, one of the key design goals was to reduce the overall weight of the vehicle by app. 8%. A large part of this accomplishment in weight reduction was attributed to design changes such as implementing a single reduction rear axle, making structural enhancements to our frame to not only lighten the structure, but also to strengthen it in areas where the frame needed to be more robust. New Flyer also worked with our sub-component suppliers in their efforts to create lighter, yet more durable and reliable components. Further, other significant design changes were made to distribute the weight of the vehicle towards the front axle, such as having a standard HVAC "roof mount" installation over the front axle as compared to the traditional "rear mount" HVAC as well as various hybrid components.

As SFMTA is aware, in 2012 Transit Agencies across the state of California fell under the scrutiny of out-dated legislation related to the maximum allowed load on the rear axle. New Flyer was actively involved in the "Rear Axle Task Force" set up by the California Transit Association to sponsor a bill to increase this maximum rear axle load, which in 2012 passed through the State Legislature and was signed into law by the Governor (AB1706). The legislation was a limited, temporary fix to allow for a TCRP study to be completed to determine the effects of transit buses at current weights on the roads and bridges. New Flyer is also an active participant in this research group. Currently AB1706 is due to lapse at the end of 2014, however AB1720 has now been introduced to extend the expiration date by an additional one year and New Flyer remains actively involved in the workgroups to achieve a realistic solution.
As part of our Continuous Improvement Initiatives, New Flyer continues to work internally on ways to further reduce the overall weight of our vehicles, especially the weight on the rear axle. We have performed preliminary studies on various methods to accomplish this, including composite materials and tag axles. At this time, although we have not decided on a path of development which we will pursue, we will continue to ready our company for several strategies should the permanent legislation prove unfavorable to the industry and feel that we already have a head start on the rest of the industry. We are confident, as the leader in the industry not only with regards to manufacturing but innovation, that with our staff of 200+ Engineers that we will be ready to comply with any new axle weight requirement that may be implemented upon our industry.

Due to our experience in recently building and delivering 112 40' Diesel Hybrid Vehicles for SFMTA, we can share accurate weights and weight distribution pertaining to these builds as follows:

SR1707:

- Weight on front axle = 9392 lbs. (avg.)
- Weight on rear axle = 20175 lbs. (avg.)
- Total weight of vehicle = 29567 lbs. (avg.)
- Weight distribution = 32% on front axle vs. 68% on rear axle

SR1709:

- Weight on front axle = 9397 lbs. (avg.)
- Weight on rear axle = 19492 lbs. (avg.)
- Total weight of vehicle = 28889 lbs. (avg.)
- Weight distribution = 33% on front axle vs. 67% on rear axle

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SR1794:

- Weight on front axle = 9342 lbs. (avg.)
- Weight on rear axle = 19483 lbs. (avg.)
- Total weight of vehicle = 28825 lbs. (avg.)
- Weight distribution = 32% on front axle vs. 68% on rear axle

To further illustrate the benefits and successes of the Xcelsior design with regards to weight, compared to our previous generation bus ("LFR"), a similar LFR configuration was approximately 8% heavier with a weight distribution of 29% total weight over the front axle and 71% total weight over the rear axle.

With regards to Driver's glare from the Windshield area New Flyer has taken close consideration to the designs of the windshield and components around the driver to minimize glare as much as possible. Materials with dull composition and color are part of the basic design in addition with a small number of black powder coated stanchions to further reduce any possible glare situations.

Please refer to the attached information regarding the ramp design and initiatives that have been put in place to address noise levels.

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SALES INFORMATION BULLETIN

#580-001 | **Model:** Xcelsior | **Lengths:** All | **Propulsions:** All

Genuine New Flyer Wheelchair Ramp

Product Features

New Flyer's patented wheelchair ramp design is a flip-out, aluminum, non-slip platform located at the entrance door of the bus. While this ramp is based on our reliable New Flyer ramp that has been in revenue service since 1993, it has been improved to now be a self-contained modular system.

The ramp system consists primarily of four components:

- Stainless steel ramp box and aluminum cover
- Hydraulic pump, reservoir and integrated manifold block
- Ramp mechanism assembly (operates entirely within stainless ramp box)
- Aluminum light-weight non-slip ramp platform

All four components operate to articulate the ramp from the stowed position in the floor to the curb or street level.

Ramp deployed at ride height street level

Benefits

- Industry-leading 1:7 slope that significantly exceeds ADA regulations
- Designed with the manual operation feature to ensure that the bus will remain in revenue service during an electrical or hydraulic ramp failure

Ramp deployed kneeled (1:7) street level

Operations

The ramp is hydraulically operated. It is completely installed within the vehicle floor and structure and is not subjected to road damage. Brake and accelerator interlocks are provided through the opening of any door. A flashing LED light and audible signal at the entrance door serve as a warning to passengers that the ramp is operating. The ramp can also be manually deployed or raised by a pull strap. The wheelchair ramp is powered by its own self-contained hydraulic power source.

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SALES INFORMATION BULLETIN

Operating Procedures

Operator's control is located on the lower right side of the driver's instrument panel. A guarded three-position switch performs the following functions:

1. Deploy
This position turns the pump on and sends a flow of oil through the manifold block to the ramp mechanism assembly. The ramp then moves from the stowed position and starts through its arc until fully deployed.

2. Float
This is the normal position of the switch and, in this position, the hydraulic pump is inoperative. The ramp will float to either the DEPLOY or STOW position. Manual operation is possible in the FLOAT position.

3. Stow
This position turns the pump on and sends a flow of oil through the manifold block to the ramp mechanism assembly to move the wheelchair ramp into the stowed position (flush with the floor).

Service / Repair

The self-contained, modular design of this ramp allows for quick removal and installation of the ramp via eight mounting bolts and one electrical connector. The harness removal can only be done at the front of the bus through the service panel (or defrost service panel). To remove the harness, two ty straps need to be cut off and then the two connectors need to be disconnected. The harness conduit retaining nut needs to be removed and each of the two connectors need to be pulled through the retaining nut separately. Two p-clips will need to be removed from under the bus structure to free the harness. This allows bench servicing if a ramp system requires repair.

The stainless steel box protects the inner components from the damaging effects of being exposed to the elements.

Testing

Durability testing: This new design has been cycled 50,000 times which equates to a 12 year life span.

Warranty

Genuine New Flyer wheelchair ramps have a warranty of one year or 50,000 miles (80,467 km).

SPECIFICATIONS

Width	32.00 inches (81.28 cm)
Length	47.50 inches (120.65 cm)
Length Beyond Bus Body	44.73 inches (113.61 cm)
Supporting Load	660 lbs. (299.40 kg)
Degree of Slope kneeling position	8° degrees to grade
Degree of Slope kneeling position (to a 6 inch curb)	2° degrees to curb
Operation Switch (3-Pole Toggle)	1. "Deploy 2. "Float" 3. "Stow"
Type	Hydraulic (electrically powered)
Cycle Times 1. Deploy 2. Stow 3. Total	 10 seconds 10 seconds 20 seconds
System Fluid Capacity	1 quart (946.35 ml)
Hydraulic System	Independent Hydraulic Power pack w/ Integrated Manifold
Hydraulic Fluid	ATF
Operating Hydraulic Pressure	1800 psi
Hydraulic Cylinder	One (deploy & stow)
Hydraulic Cylinder Size	1.5" (38.1 mm)dia. Bore x 3.5" (88.9 mm) Stroke 0.75" (19.05 mm) dia. Rod Double acting welded construction 2500 psi (working pressure rated)
Weight of Complete Lift Assembly	130 lbs (58.97 kg)

NEW FLYER

NOISE/VIBRATION LEVEL REDUCTION

New Flyer Xcelsior buses are designed with consideration of noise and vibration reduction. Here are the major area design consideration for reduce noise levels.

Engine & transmission (including conventional transmission and Hybrid Drive Unit):

- Engine is installed on rubber isolator engine mounts which are analyzed by the manufacturer
- The engine compartment airborne noise minimized into the cabin by use of the perforated aluminum sheet that allows airborne noise to enter into acoustic sandwich foam with a dense rubber barrier to dampen and minimize noise transfer into the cabin area.
- The rear bulkhead and rear upper deck are incorporated with dB plywood flooring which has shown overall noise reduction in the
- To date New Flyer has reduced noise transmission from the engine compartment with improved sound insulation and sound barrier material on strategic metal surfaces. Additional sealing of the engine compartment has been incorporated to eliminate any opening that would allow noise to enter the passenger compartment

Differential

- Noise and vibration is minimized by use of a single reduction hypoid axle (no outboard planetary gear sets)

Compressor

- Ping tank dampens reciprocating compressor pulses to minimize the noise. A larger copper line between the ping tank and air dryer is stiffer and reduces lower frequency vibration, also the rubber covered p-clips aid in reducing vibration
- Addition of twin compressor means the compressor pumps half the time and at higher frequency pulses (two times per revolution versus one) – which reduces the noise level at higher, less obtrusive frequency

HVAC System

- The HVAC unit has been designed, components have been relocated and baffles have been added to redirect the airflow for quieter noise levels. Also sound absorbing materials have been added to the ductwork to reduce the overall noise levels of the unit
- The roof mounted HVAC resulted in much improved rear noise levels

Windshield Wiper

- New Flyer offers high a quality electric motor wiper system on Xcelsior as standard which is quieter that the air operated wipers

Power Steering

- Pulsations in the power steering pumps are one of the biggest contributors to the power steering noise. New Flyer provides a smooth-flowing vane pump to minimize noise coupled with smooth-bend stainless steel tubing plumbing and minimized fittings. New Flyer carried over these concepts coupled with the improved mounting from the LFR model.

Tire noise through wheel wells

- Tire noise is dependent on tire selected and vehicle speed, New Flyer continued the LFR wheel well concepts. Depending on the location (front or rear), the stiffness of the panels minimizes the transmission of road noise through the panels. A mix of curved and bent stainless steel panels is employed and is welded into the structure for added support and securement. Additionally, the panels are fully sealed from the interior of the bus. Undercoating is applied not only as a corrosion protection, but also has a dampening affect. The use of rubber or Vinyl

flooring on the interior finishes off the design which serves as further noise dampening effect in addition to its main function as finished floor

Air Discharge

- The air dryer discharge noise is related to the air dryer. On the proposed Haldex air dryer, a diffuser installed on the purge exhaust minimizes the air flow rush and serves to dampen the noise of rapid decompression of the air dryer.

Cooling System Fan

- The proposed EMP electric cooling fan system includes the Curbside Noise Abatement Feature

Rotating components (Driveshaft)

- Since the noise from rotating components is exacerbated by offset alignment, New Flyer has designed the engine/transmission to axle input to be in-line. Additionally, U-joint drive shafts must be assembled in phase for proper operation and thus have specified phase marks on the driveshaft for proper assembly.