

Total IFTA Compliance Platform

IFTA Exception Engine

Technical Specification

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Purpose of This Document

This document defines the complete technical specification for the IFTA Exception Engine within the Total IFTA Compliance Platform. It covers all exception types, their detection logic, severity classifications, threshold values, user interface behavior, resolution paths, and escalation rules. This specification serves as the authoritative reference for development, QA testing, and product management.

Exceptions in the platform serve two purposes: (1) protecting carriers from filing incorrect returns that could trigger audits or penalties, and (2) giving the platform a defensible audit trail showing that all filings were reviewed before submission.

1. Severity Level Definitions

All exceptions in the platform are assigned one of four severity levels. The level determines whether a filing is blocked, whether acknowledgment is required, and how the exception is surfaced in the UI.

 CRITICAL	Filing is blocked. Exception must be resolved before submission is permitted. Data is definitively wrong and filing would produce an incorrect return.
 HIGH	Filing is not blocked but carrier or administrator must explicitly acknowledge the exception and provide a written reason before proceeding. Logged with timestamp and user ID.
 MEDIUM	Informational warning displayed in the filing workflow. No acknowledgment required. Carrier is made aware but filing proceeds. Exception is logged.
 INFO	Background audit-risk awareness. Displayed in the carrier dashboard audit risk summary. Does not interrupt the filing workflow in any way.

2. Critical Exceptions — Filing Blocked

The following exceptions must be resolved before the system will permit submission of a quarterly IFTA return. In each case the data is definitively incorrect and filing would produce an invalid return.

Exception Name	Field(s)	Threshold / Trigger	UI Behavior	Resolution Path
Odometer Regression	ending_odometer, starting_odometer	ending_odometer < starting_odometer	Red banner at top of filing screen. Filing button disabled. Error message: 'Ending odometer is less than starting odometer. Please correct before filing.'	Carrier corrects odometer values. System re-validates on save.
Duplicate Fuel Receipt	receipt_date, location_state, gallons, vehicle_id	Exact match on all four fields within same quarter	Red inline alert on fuel entry screen flagging duplicate. Duplicate record highlighted. Filing blocked until one is removed.	Carrier removes duplicate entry.
Implausible Fuel Amount	gallons_purchased, vehicle_tank_capacity	gallons_purchased > vehicle_tank_capacity	Red alert on fuel entry row. Message: 'Gallons entered exceed this vehicle's tank capacity. Please verify.'	Carrier corrects gallons or updates vehicle tank capacity in fleet profile.
Jurisdiction Miles Do Not Balance	sum(state_miles), total_fleet_miles	Variance > 1% OR > 50 miles	Red banner. Miles summary table highlighted showing discrepancy. Filing blocked.	Carrier reconciles state miles against total fleet miles.
Total Miles Don't Reconcile with ELD/Odometer	total_reported_miles, eld_total_miles, odometer_miles	Variance > 1% OR > 50 miles	Red banner showing variance amount. Source comparison table displayed. Filing blocked.	Carrier reviews ELD data export and manually reconciles.
Fuel Type Mismatch	vehicle_fuel_type, receipt_fuel_type	Mismatch between vehicle profile and receipt	Red alert on fuel entry row. Message: 'Fuel type on this receipt does not match vehicle profile.'	Carrier corrects receipt fuel type or updates vehicle profile.
Oregon Miles at Non-Zero Tax Rate	state_miles['OR'], ifta_tax_rate['OR']	OR tax rate > \$0.00 on IFTA return	Red alert. Message: 'Oregon miles	System auto-corrects OR rate to \$0.00.

Exception Name	Field(s)	Threshold / Trigger	UI Behavior	Resolution Path
			should carry a \$0.00 IFTA tax rate. Oregon WMT is filed separately.' Filing blocked.	Carrier reviews and confirms.
Tax Rate Change Not Split Mid-Quarter	state_miles['XX'], rate_change_date, quarter_start, quarter_end	Rate change date falls within quarter and miles not split	Red alert. Message: 'Tax rate changed on [date] in [state]. Miles must be split before and after the rate change.' Filing blocked.	System auto-splits miles if ELD data is available. Manual entry otherwise.
Canadian Miles — No Currency Conversion	state_miles['CA_XX'], exchange_rate	Canadian province miles present and exchange_rate is null or 0	Red alert. Message: 'Canadian province miles require a currency conversion rate. Please verify the rate for this quarter.' Filing blocked.	System auto-populates current exchange rate from configurable rate source. Carrier confirms.
Vehicle Miles Before Add Date	vehicle_start_date, miles_start_date	miles_start_date < vehicle_start_date	Red alert. Message: 'Miles recorded before this vehicle was added to the IFTA fleet. Please remove pre-registration miles.' Filing blocked.	Carrier deletes pre-registration miles or corrects vehicle start date.
Multiple ELD Units — Overlapping Data	vehicle_id, eld_unit_id, date_range	Two ELD records for same vehicle on same date(s)	Red alert. Message: 'Overlapping mileage data detected from two ELD units on this vehicle. Miles may be double-counted.' Filing blocked.	Carrier selects primary ELD record for overlap period. System deactivates duplicate.

3. High Exceptions — Acknowledgment Required

The following exceptions do not block filing but require the carrier or administrator to explicitly review, acknowledge, and provide a brief written explanation before the system records the override and permits submission. All acknowledgments are logged with timestamp, user ID, and entered reason.

Exception Name	Field(s)	Threshold / Trigger	UI Behavior	Resolution Path
MPG Too High or Too Low	total_miles, total_gallons, fleet_mpg	MPG < 3.0 OR MPG > 12.0 (configurable per vehicle class)	Orange banner. MPG value highlighted. Message: 'Fleet MPG of [X] is outside the expected range. Please verify fuel and mileage totals.' Acknowledgment modal required.	Carrier reviews fuel receipts and mileage. Enters explanation. Override logged.
Fuel Tax Owed Unusually High or Low	net_tax_due, prior_quarter_avg_tax	Net tax > 3x OR < 0.33x prior quarter average	Orange banner. Tax summary highlighted. Message: 'Net tax due is significantly different from your prior quarter average. Please review.' Acknowledgment required.	Carrier reviews fuel purchases and mileage by state. Enters explanation.
States With Miles and No Fuel	state_miles['XX'], state_fuel['XX']	state_miles > 0 AND state_fuel = 0 for any jurisdiction	Orange inline flag on affected state rows in the jurisdiction table. Message: 'Miles recorded in [state] with no fuel purchases. This is common for short pass-through states but requires confirmation.' Acknowledgment required.	Carrier confirms miles are accurate. Override logged per state.
Fuel Purchases With No Mileage	state_fuel['XX'], state_miles['XX']	state_fuel > 0 AND state_miles = 0 for any jurisdiction	Orange inline flag on affected state rows. Message: 'Fuel purchased in [state] with no miles recorded. This is common for fuel stops near state lines but requires confirmation.'	Carrier confirms purchase is accurate. Override logged per state.

Exception Name	Field(s)	Threshold / Trigger	UI Behavior	Resolution Path
			Acknowledgment required.	
Large Negative Net Tax (Credit)	net_tax_due	Net credit > \$500 (configurable)	Orange banner. Message: 'Your return shows a net credit of \$[X]. Large credits are an audit flag. Please verify all fuel purchases and mileage before filing.' Acknowledgment required.	Carrier reviews return. Enters explanation. Override logged.
Implausible Daily Mileage	vehicle_daily_miles, hos_max_daily_miles	Daily miles > 700 (configurable HOS limit)	Orange flag on vehicle detail. Message: 'Vehicle [ID] shows [X] miles on [date], which exceeds the maximum possible under HOS rules. Please verify.' Acknowledgment required.	Carrier reviews ELD data for that date. Corrects or confirms. Override logged.
Fuel Receipt Location Inconsistent with Route	receipt_state, vehicle_gps_states_on_date	Receipt state not in GPS state list for that date	Orange flag on receipt. Message: 'Fuel receipt for [date] is in [state] but vehicle GPS shows no travel in that state on that date.' Acknowledgment required.	Carrier confirms receipt or removes it. Override logged.
Reefer Fuel Potentially Included	total_gallons, vehicle_type, estimated_reefer_consumption	Diesel vehicle with reefer and gallons > expected propulsion threshold	Orange banner. Message: 'Total fuel recorded may include reefer fuel. IFTA only covers propulsion fuel. Please verify.' Acknowledgment required.	Carrier confirms propulsion-only fuel total. Override logged.
Surcharge State — Missing Schedule 2	state_miles['IN'], state_miles['KY'], state_miles['VA'], schedule2_complete	Miles in IN, KY, or VA and Schedule 2 not completed	Orange alert. Message: '[State] requires a fuel use surcharge on Schedule 2. This has not been completed.' Acknowledgment required.	System pre-populates Schedule 2 from mileage data. Carrier reviews and confirms.

Exception Name	Field(s)	Threshold / Trigger	UI Behavior	Resolution Path
ELD Data Gap	vehicle_id, date, miles_recorded, out_of_service_flag	Zero miles on a date and out_of_service_flag = false	Orange flag on vehicle timeline. Message: 'No mileage recorded for vehicle [ID] on [date(s)]. Vehicle was not marked out of service.' Acknowledgment required.	Carrier marks vehicle out of service for that period OR enters manual mileage. Override logged.
VIN Mismatch on Fuel Receipt	receipt_vin, fleet_vins[]	receipt_vin not in fleet vehicle list	Orange flag on receipt. Message: 'VIN on this receipt does not match any vehicle in your fleet.' Acknowledgment required.	Carrier corrects VIN, assigns receipt to correct vehicle, or removes receipt.
New Carrier First Filing	carrier_id, filing_count	filing_count = 1	Orange banner. Message: 'This is your first IFTA filing. Please review all account setup, jurisdiction registrations, and vehicle records before submitting.' Acknowledgment required.	Administrator reviews setup. Confirms. Override logged.

4. Medium Exceptions — Informational Warning

The following exceptions display a warning in the filing workflow but do not require acknowledgment. They are logged automatically for audit trail purposes and displayed in the carrier's exception history.

Exception Name	Field(s)	Threshold / Trigger	UI Behavior	Resolution Path
MPG Varies Significantly Across Similar Vehicles	fleet_mpg_by_vehicle_class	Any vehicle MPG deviates > 25% from class average	Yellow inline flag on vehicle. Message: 'This vehicle's MPG is significantly different from similar vehicles in your fleet. Review for data errors or mechanical issues.'	Carrier reviews vehicle. No action required to file.
MPG Drops Suddenly vs. Prior Quarter	vehicle_mpg_current, vehicle_mpg_prior	MPG drops > 20% vs. same vehicle prior quarter	Yellow flag on vehicle. Message: 'MPG for vehicle [ID] dropped [X]% from last quarter. This may indicate a data error or mechanical issue.'	Carrier reviews. No action required to file.
Large Cash Fuel Purchases	receipt_payment_type, gallons	payment_type = 'cash' AND gallons > 100	Yellow flag on receipt. Message: 'Large cash fuel purchase noted. Cash receipts are harder to verify and are an audit risk.'	Carrier retains physical receipt. No action required to file.
Consistent Rounding of Mileage Figures	state_miles_entries[]	3 or more state entries are round numbers (divisible by 50)	Yellow banner. Message: 'Several state mileage entries appear to be estimated round numbers. IFTA requires actual recorded mileage. Round numbers are a common audit trigger.'	Carrier reviews ELD data. No action required to file.
Same MPG Multiple Consecutive Quarters	vehicle_mpg_history[]	MPG identical for 3 or more consecutive quarters	Yellow flag. Message: 'Vehicle [ID] has reported identical MPG for [X] consecutive quarters. This may indicate an assumed rate is	Carrier verifies fuel and mileage tracking method. No action required to file.

Exception Name	Field(s)	Threshold / Trigger	UI Behavior	Resolution Path
			being used rather than actual data.'	
Carrier Operating in New Jurisdiction	state_miles['XX'], prior_quarters_states[]	New state appears that was not in prior quarter	Yellow flag. Message: 'You have miles in [state] this quarter for the first time. Verify you are registered for any applicable weight/mileage taxes in this state.'	System cross-checks against weight/mileage tax state list and escalates if applicable.
Jurisdiction Count Changed Significantly	state_count_current, state_count_prior	State count changes by more than 5 vs. prior quarter	Yellow banner. Message: 'You operated in [X] more/fewer states this quarter than last quarter. Please confirm this reflects an actual route change.'	Carrier confirms route change. No action required to file.
Miles in Non-IFTA Jurisdiction	state_miles['AK'], state_miles['HI']	Miles recorded in AK or HI	Yellow flag. Message: 'Miles in Alaska or Hawaii are not subject to IFTA. These will be excluded from your IFTA return.'	System auto-excludes from IFTA return. Carrier informed.
Bulk Fuel Usage Inconsistency	bulk_fuel_pumped, vehicle_consumption_estimate	Variance > 15% between gallons pumped from bulk and estimated consumption	Yellow flag. Message: 'Bulk fuel usage does not match estimated vehicle consumption. Verify pumping records.'	Carrier reviews bulk fuel logs. No action required to file.
Prior Quarter Amendment Triggered	late_receipt_date, filed_return_date, original_return_id	Fuel receipt dated within prior quarter received after that return was filed	Yellow banner. Message: 'A fuel receipt for Q[X] has been entered after that return was already filed. An amended return may be required.'	Carrier reviews and decides whether to file an amendment. System generates amended return draft.
Vehicle Type Change During Quarter	vehicle_class_history[], quarter_start, quarter_end	Vehicle reclassification date within the quarter	Yellow flag. Message: 'Vehicle [ID] was reclassified during this quarter. Verify IFTA qualification	Carrier confirms classification. No action required to file.

Exception Name	Field(s)	Threshold / Trigger	UI Behavior	Resolution Path
			status for each period.'	

5. Informational Exceptions — Audit Risk Dashboard

The following conditions are not errors. They are displayed in the carrier's audit risk dashboard and exception history for awareness and audit preparedness. They do not appear in the filing workflow and do not affect submission in any way.

Exception Name	Field(s)	Threshold / Trigger	UI Behavior	Resolution Path
Zero Operations Quarter	total_miles, total_gallons	total_miles = 0 AND total_gallons = 0 for entire quarter	Dashboard notice: 'No operations recorded this quarter. A zero return will be filed as required.' No filing workflow interruption.	System auto-generates zero return. No carrier action required.
First Quarter for New Vehicle	vehicle_start_date, quarter_start	vehicle_start_date > quarter_start (vehicle added mid-quarter)	Dashboard notice: 'Vehicle [ID] was added on [date]. Only miles and fuel from [date] forward are included in this return.'	System auto-limits data to post-add-date. No carrier action required.
Vehicle Removed Mid-Quarter	vehicle_end_date, quarter_end	vehicle_end_date < quarter_end	Dashboard notice: 'Vehicle [ID] was removed on [date]. Only miles and fuel through [date] are included in this return.'	System auto-limits data to pre-removal date. No carrier action required.
Tax Rate Changed Mid-Quarter — Auto-Split Applied	state_id, rate_change_date, miles_split	Rate change detected and system successfully auto-split miles	Dashboard notice: 'Tax rates changed in [state(s)] on [date]. Miles have been automatically split and correct rates applied.'	Carrier informed. No action required.
IFTA License Expiring	ifta_license_expiry_date	Expiry within 90 days	Dashboard reminder: 'Your IFTA license expires on December 31. Renewal opens October 1.' Escalates to HIGH if within 30 days with no renewal initiated.	Carrier initiates renewal. Escalation auto-clears when renewal is recorded.
Decals Expiring	decal_expiry_date	Expiry within 60 days	Dashboard reminder: 'IFTA decals expire on December 31. Order replacement decals before January 1.'	Carrier orders decals. No action required in platform.
Late Filing Risk	return_due_date, current_date, return_status	return_status = 'not filed' AND current_date > (due_date -	Dashboard reminder: 'Your Q[X] return is due on [date] and has not been filed. File now to avoid a \$50 or 10% penalty.'	Carrier files return. Reminder auto-clears on filing.

Exception Name	Field(s)	Threshold / Trigger	UI Behavior	Resolution Path
Weight/Mileage Tax State — Unregistered	state_miles['KY','NM','NY','OR','CT'], carrier_registrations[]	Miles > 0 in KY, NM, NY, OR, or CT and no registration on file	Dashboard alert: 'You have miles in [state] this quarter but no [KYU/WDT/HUT/WMT/HUFF] registration on file. You may be required to register and file separately.' Escalates to HIGH if miles > 500.	Carrier reviews state requirement . Escalation fires at 500-mile threshold.

6. Escalation Rules

The following rules govern automatic escalation of exceptions from a lower severity level to a higher one based on pattern detection, time sensitivity, or threshold crossings.

6.1 Pattern-Based Escalation

Any Medium exception that appears in three or more consecutive quarters automatically escalates to High for the following quarter. The system generates a notification to the carrier administrator when this escalation fires.

Affected exceptions: MPG Varies Significantly, MPG Drops Suddenly, Consistent Rounding of Mileage, Same MPG Multiple Quarters, Bulk Fuel Inconsistency.

Database field: exception_history.consecutive_quarter_count

Trigger: consecutive_quarter_count >= 3

Action: Set exception.severity = HIGH for current quarter. Log escalation event with timestamp.

6.2 Time-Based Escalation

Several Informational exceptions escalate automatically as deadlines approach.

Exception	Info Fires At	Escalates to HIGH At	Escalation Condition
IFTA License Expiring	90 days before Dec 31	30 days before Dec 31	No renewal initiated
Late Filing Risk	14 days before due date	3 days before due date	Return still not filed
Weight/Mileage Tax State Unregistered	1+ miles in state	500+ miles in state	No registration on file

6.3 Audit Trail Requirements

Every exception acknowledged or overridden at the High level must generate an immutable audit log entry containing the following fields:

- exception_id — unique identifier for the exception instance
- carrier_id — carrier account that filed the return
- user_id — user who acknowledged the exception
- user_name — full name of acknowledging user
- timestamp — UTC datetime of acknowledgment
- exception_type — exception code from the master exception list

- `severity_at_time` — severity level at the time of acknowledgment
- `reason_entered` — free-text explanation entered by the user (required, minimum 20 characters)
- `quarter` — tax quarter and year the return covers
- `return_id` — the specific return the exception was associated with

Audit log entries are read-only once created. They cannot be edited or deleted by any user role including system administrator.

7. Configurable Threshold Reference

The following thresholds are configurable at the platform level by a system administrator. Default values are shown. Individual partner accounts may be given the ability to adjust thresholds within defined bounds.

Parameter	Default Value	Allowable Range	Notes
MPG Lower Threshold	3.0	1.0 – 5.0	Below this value triggers HIGH exception
MPG Upper Threshold	12.0	10.0 – 20.0	Above this value triggers HIGH exception
MPG Variance vs. Class Average	25%	10% – 40%	Triggers MEDIUM exception
MPG Quarter-over-Quarter Drop	20%	10% – 35%	Triggers MEDIUM exception
Net Credit Threshold (HIGH)	\$500	\$100 – \$2,000	Large credits above this trigger HIGH
Max Daily Miles (HOS)	700	500 – 800	Per vehicle per day
Miles Balance Variance	1% or 50 mi	Non-configurable	Either condition triggers CRITICAL
Cash Purchase Gallons Threshold	100 gal	50 – 500	Triggers MEDIUM exception
Consecutive Quarters for Escalation	3	2 – 5	MEDIUM to HIGH escalation
WMT State Miles for Escalation	500 mi	100 – 1,000	INFO to HIGH escalation
License Renewal Early Reminder	90 days	60 – 120 days	INFO reminder fires
License Renewal HIGH Escalation	30 days	14 – 45 days	Only if no renewal initiated
Late Filing Early Reminder	14 days	7 – 30 days	INFO reminder fires
Late Filing HIGH Escalation	3 days	1 – 7 days	Only if not filed
Reason Text Minimum Length	20 chars	10 – 100 chars	Required for HIGH acknowledgment

8. UI Behavior Summary

8.1 Filing Workflow Screen

- CRITICAL exceptions display as a full-width red banner at the top of the screen. The Submit button is replaced with a disabled 'Resolve Exceptions to File' button. A numbered list of all Critical exceptions is shown with links to the affected data.
- HIGH exceptions display as a full-width orange banner below any Critical banners. The Submit button is replaced with a 'Review & Acknowledge to File' button that opens the acknowledgment modal.
- MEDIUM exceptions display as yellow inline flags on the affected rows in the jurisdiction table or fuel entry screen. A summary count appears in a yellow banner at the top. The Submit button remains active.
- No exceptions display no banners. Submit button is active and labeled 'File Return'.

8.2 Acknowledgment Modal (HIGH)

- Lists each High exception with a brief description.
- Each exception has a required free-text reason field (minimum 20 characters).
- A checkbox: 'I confirm I have reviewed the above exceptions and the information in this return is accurate to the best of my knowledge.'
- Submit is disabled until all reason fields are completed and checkbox is checked.
- On submit, acknowledgment is logged and filing proceeds.

8.3 Audit Risk Dashboard

- Separate dashboard tab showing all INFO and MEDIUM exceptions across all quarters.
- Filterable by quarter, vehicle, exception type, and severity.
- Shows exception history trend — whether a MEDIUM exception is appearing for the first time or has appeared in consecutive quarters.
- Escalation warnings highlighted when a MEDIUM is approaching the 3-quarter escalation threshold.
- Downloadable exception report for audit preparation.

8.4 Notification Delivery

- CRITICAL and HIGH exceptions: in-app notification + email to account administrator.
- Time-based escalations (license expiry, late filing): in-app notification + email.
- MEDIUM and INFO exceptions: in-app only. No email unless carrier opts in.