TERMINOLOGY OF THE AUTOMOTIVE LATCHES AND LOCKS

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1. Technical definitions

Actuator
An electro-mechanical device used for moving or controlling a component of the latch.

Adjunct Actuator
A power actuator of modular design which attaches to typically the cover plate of a latch. This is an improvement over the original power lock designs, where the actuator mounted separately to the door inner panel. (The adjunct actuator may be power lock, power release, or power cinching or combination)

Ajar Position Of Lift Gate
Position in which the lift gate is down but the ratchet in the lift gate latch is either in the secondary position or fully open.

Analysis
Simulation of the product and the specified condition using mathematical representation (e.g., mathematical models algorithms, equations) and noting the results.

Auxiliary Door Latch
A latch or latches, other than the primary latch or latches, fitted to a back door or back door system that is equipped with more than one latch.

Back Out
The distance which the latch and lift gate moves outboard (positive) or inboard (negative) when the inside or outside unlatching mechanism is actuated to move the pawl from fully latched position to a point where it disengages from the ratchet and the latch and the lift gate is released. This distance is measured in millimetres and depends on geometry of pawl and ratchet interface.

Back Door (Lift Gate)
A door or door system on the back end of a vehicle through which passengers can enter or depart the vehicle, or cargo can be loaded or unloaded, (except; the trunk lid of a passenger car whose trunk is separated from the passenger compartment by a partition; a door or window composed entirely of glazing material whose latches and/or hinges are attached directly onto the glazing material.)

Binding
A failure condition which occurs when a lever is prevented from free movement by interference with other parts.

Bat Wing
A uniquely named component on the NS sliding door upper hinge where the name describes the shape of a small stamped steel plate mounting to the top of the upper hinge, to prevent the hinge roller from exiting the end of the upper track.

Belt line
The approximately horizontal boundary line where the bottom of the vehicle’s side glass meets the sill of the door sheet metal. There is a trim and window seal component, which covers the top of the up standing flange of the door outer panel to become the “belt line”

Best in Class (BIC)
A feature which functions to meet design objectives at the highest level of all similar products on the market.

Block out
A design feature to disable a user input where the input device is blocked from moving. Generally this approach is not preferred as the system is loaded by the handle output, and the user may experience discomfort and confusion as to proper method of operation.

Body in White (BIW)
A summary of all components that are assembled and or welded prior to body paint (including doors, hoods, decks and lift gates)

Brain plate
A logic mechanism separated from the latch, which interfaces between customer inputs and the latch.

Centre Hinge
A door support assembly mounted at the rear of a sliding door in the neighbourhood of the middle of the door
height. This “hinge” includes rollers, which run in the centre track and a pivot pin to allow the rollers to follow the track at when the track curves rapidly inboard as the door reaches the closed position. The adjustment of the mounting of the centre hinge to the door inner panel locates the door fore and aft. On the NS vehicle an additional vertical adjusting “jack screw” provides adjustment for the height of the back of the door.

Centre Track
An approximately horizontal channel mounted to the body of a vehicle, which has a sliding door. The track guides and supports the rear of the door through the centre hinge. This track has the greatest curvature near the C-pillar (front end of track) which causes outboard travel of the rear of the door such that the sliding door trim panel will clear the body rear quarter panel before moving rearward. The curvature of the track is critical to door movement. The body mounted primary door seal force combined with the shape of the track must position the door following latch release such that when the door is pushed rearward it must be around the curve enough to move smoothly rearward without jamming.

Child Safety Lever
A lever in the latch operable through a latch mounting hole in the shut bevel face or a lever in control assembly, which can be set at customer’s choice to provide either free wheeling or non free wheeling. The lever is accessible only when the door or lift gate is open or operable by a key or security device not accessible to minors. When engaged will not allow the door to be opened from the inside of the vehicle.

Cinching Latch
A certain latch which is capable of engaging the striker and pulling the door or element to the fully latched position. Typically the door must be closed to the secondary latched position for cinching to begin.

Control Assembly
A locking mechanism used to transmit release travel from handle to latch or latches. Depending on design of a latching system it may contain locking levers, child safety lever, power options or glass latch. It interacts with the customer inputs (handles, buttons and levers) to provide logic for the operation of the latch. Typical side door latches are located such that handles and lock inputs are directly connected to the latch. In contrast sliding doors, lift gates, and cargo doors frequently require an intermediate “Control assembly” which is positioned remote from the latch but closer to the actual input handles.

Cover Plate
The cover plate is differentiated from the main plate by generally enclosing the latch and generally contributes to latch structure to a lesser extent than the main plate. The cover plate commonly includes a flange for the mounting of the inside input levers for side door latches.

Day Light Opening
The area of glass through which one can see out of the vehicle. Does not include areas obscured by trim or window blackout.

Demonstration
Exercising the product under specified conditions, in accordance with a procedure, and noting the results.

Detent, Detent Lever
See Pawl.

“Dog House”
Reinforcement added to inside sheet metal of a lift gate to strengthen the mounting area of a latch.

Door (Lift Gate) Bounce
A failure condition which occurs under extremely hard door slam where the latch fails to remain latched when door rebounds off the weather-strip, causing the door to move to fully open or secondary position.

Door Check(er)
A device which limits the full open position of a swinging door.

D-ring (Body Opening)
An opening in the body surface to which the outer edge of the lift gate must fit.

Double Lock
European style locking which disables inside as well as outside handles and the ability to unlock from inside. Makes theft more difficult by reducing access under instrument panel, and makes thief enter and exit through broken window (conspicuous).

Durability
The life of the product, in time or miles, at which an overhaul, rebuild, or replacement, of the product is required in order for it to perform its function(s).

Fish Mouth
The part of a latch that accepts and guides the striker into the ratchet as the lift gate is closing.

Force Transmitting Devices (Cables, Rods etc.)
The force transmitting devices are located between latch and customer operated means, i.e. handles, buttons, key cylinders, actuators etc.
Fork Bolt
See Ratchet.

Frewheel
A disabling feature which allows a handle or user input to move freely through full travel without imparting the intended function (due to disable selection). Freewheeling approach is opposite of block out approach where input travel is jammed.

a) Full time free-wheeling latch:
A latch that is equipped with a device or mechanism which does not permit it to be unlatched through the inside remote handle when locking knob is in locked position. The handle may be turned without any resultant action in the latch.

b) Non free-wheeling latch (latch with inside handle override):
A latch which is operative through the inside remote handle in either locked or unlocked position (same as in front doors). See also undogging action.

c) Selective Free Wheeling Latch
A latch equipped with Child Safety Lever operable through a latch mounting hole in the shut bevel face, which can be set at customer's choice to provide either free wheeling or non free wheeling.

The above free wheeling functions can be incorporated into a control assembly instead of a latch especially in systems with more than one latch.

Fuel Blocker Latch
A latch used on a sliding door to hold the sliding door closed while the fuel filler door is open, on the side of the vehicle which includes the fuel filler access. The optimal design for the fuel blocker latch is to allow partial main latch release but to stop the door as it moves from fully latched position towards the secondary position. In this case when the fuel door is closed after the fuel blocker latch has been engaged, the latch will still catch at the secondary latched position. This prevents door opening in the case that the fuel door is closed following fuel blocker engagement, while driving the vehicle or stopped. When the door is in the secondary position the fuel blocker latch cannot engage, so if the fuel door is opened a spring is engaged to bias the fuel door towards the closed position. Double block out is possible where the fuel door cannot be opened if the sliding door is not fully closed, however this is not recommended for vehicles utilizing a plastic fuel door.

Full Open Bumper
A bumper which limits sliding door travel at the full open position. For NS the full open bumper is mounted to the door after the door is mounted on the vehicle, and the bumper engages the C-pillar edge. The full open bumper is located close to the door centre of gravity in the Z-direction to reduce door tilt when slammed open to engage bumper. On NS there is a supplemental bumper on the hold open striker to stop the lower hinge should the door tilt. The batwing on the upper hinge also engages the upper track end cap to prevent the hinge from leaving the upper track.

Hem Flange
A sheet metal attaching method typically used on doors to attach two generally parallel panels (inner and outer) by folding one over the other and pinch welding to secure.

Hold Open Latch
A latch used in a sliding door system to maintain the door in a full open position regardless of vehicle attitude to the horizon. Typically but, not limited to, a positive latch released by a tension cable. The NS design is packaged on the top surface of the lower hinge, and engaging a hold open striker, which hangs down from the bottom of the step sill.

Hold Open Striker
A striker used with the hold open latch, which mounts to the body and engages the hold open latch to hold the door open (sliding door).

Housing
The component which generally encloses the latch. In typical side door applications this is a moulded plastic component, which holds springs and bumpers and protects against foreign material interference. In hood latches and some specialty latches the housing may be a stamped plate, which has flanges or drawn sections to encompass the latch.

Illuminated Entry
A feature where interior vehicle lighting is illuminated following outside handle motion, key cylinder motion, or RKE input.

Inboard
A relative term referring to a position closer to the cross car centerline of the vehicle (Y=0)

Inner Panel
The door sheet metal panel on the inboard side of the door. The inner panel extends the width of the door where the outer panel hems over to create the door cut line. The inner panel is generally covered by the trim panel except around the periphery of the door.
Inspection
Examination of the product to note specified physical characteristics.

Interlock Striker
A striker mounted on the front of the sliding door which nominally has no engagement with the B-pillar of the body, but rather hovers in the centre of a hole in the pillar. In a crash situation this striker (with other hardware) will resist outward motion of the front of the sliding door by engaging the edge of the hole in the B-pillar.

Intermediate Lever
A lever in a mechanism, which is driven by another lever and not directly connected to a user input. The intermediate lever is typically always driven regardless of freewheeling action (i.e. lock or child safety)

Intermittent Lever
A lever in a mechanism, which can provide controlled intermittent engagement to freewheel input motion and prevent release of the latch. As the name implies this lever can be positioned to engage or to not engage and thereby provide control and logic over the release of the latch

Intrusion Beam
A door strengthening device which extends from the front to end of the door to limit side intrusion of another vehicle impacting the side of the vehicle. The beam is typically a welded assembly with either formed panels or an attached tube.

Key Cylinder
A typically die cast body with inserted “bits” which are spring biased such that the core can only rotate when the bits are positioned to match with the intended key. The key cylinder is typically mounted to the door outer panel or integrated to the outside handle to allow operation from the outside of the vehicle. The key cylinder is typically connected by rod to the latch or control assembly to facilitate lock and unlock of the latch or latching system.

Keyless Locking
A procedure to lock the door (lift gate) from outside without using the key by locking with inside locking knob (presetting latch locking lever) and slamming the door.

Latch
The latch is attached to the door inner panel and engaged on to the striker keeping the door closed until released by the operator.

Latching Efforts
The force in Newton applied to a door or lift gate in latching direction which causes striker to enter the fish mouth and rotate the ratchet to primary latched position under seal load.

Locked Position
The position of actuating levers causing the pawl to be inoperative unless the latch is unlocked either through the key cylinder, inside locking knob, remote control or undogging action.

Locking Knob
A knob used to manually operate locking mechanism in the latch or control assembly to toggle the state of the latching system between locked and unlocked. Can be rotary or linear. Also serves as an indicator.

Longitudinal Strength
Strength for side door latches representing a pull to separate the latch and striker parallel to the length of the vehicle. As applied to the latch the force is perpendicular to the plane of the ratchet, tending to pull the ratchet through the main plate. When applied to latches on the rear of the vehicle or cargo door latches in different orientation, the force application direction remains perpendicular to the plane of the ratchet tending to pull the latch off the striker.

Lost Motion
A phenomena where in a series of driven moving parts, a certain amount of input travel must be expended before any output travel is achieved. This may be an intentional feature for example in the connection of key cylinder rods where lost motion is required to allow manual operation, or may be an undesirable inefficiency of the mechanism. Lost motion may also be used to supply intentional pretravel.

Lower Hinge
A roller “hinge” which supports the weight of a sliding door and runs in a track under the step sill of the body aperture (located at front of door to accommodate track under sill). The hinge controls the height of the front of the door and the inboard / outboard location of the lower front of the door.

Lower Track
A welded assembly of body in white sheet metal which provides the path for the lower front hinge during door motion. The lower track includes a channel for inboard / outboard positioning of the lower front of the door and may also include the support surface for the door support roller.

Main Plate
A latch component which provides a structure for a latch (door, hood, deck) which is closest to the ratchet and pawl, is generally the thicker of two plates when two plates are used. The main plate generally provides the mounting surface for the latch.
Mean Lockup Point
The center of engaged striker pin when engaged with fork bolt in primary latched position and latch is under seal load.

Mean Swing Line
Theoretical line perpendicular to door hinge center about which the door rotates.

Orthogonal Strength
A strength required for latches in lift gate and cargo doors which is perpendicular to the transverse and longitudinal directions and in the direction to separate the latch and striker.

Outboard
A relative term referring to a position cross car which is farther from the centerline of the vehicle (Y=0)

Outer Panel
The outboard panel of the door, which is generally visible painted body colour.

Maximum travel
Travel of a lever of a latch or handle from its rest position to its stop. It is consist of travel to release and overtravel.

Overcenter Angle (for toggle spring)
An angle between a line drawn from the pivot point of a lever through the center of the spring mounting hole in frame and line drawn from center of spring mounting holes in frame through center of spring mounting hole in lever.

Overslam
Distance measured in millimetres between striker in the primary latched position and striker in position of maximum possible penetration of striker into the latch. Overslam condition is necessary in every latch to allow the pawl enough time to rotate towards ratchet and lock it before striker comes back from overslam to latched position into closed position.

Overslam Bumper
A bumper to stop excessive overtravel of the closing element (door, hood, deck, lift gate). In hood applications the overslam bumper commonly mounts to the cross member and is adjustable for setting the hood flushness. In latches, the bumper is held at the end of the fish mouth either by the plastic housing or on deck latches by the cover plate. Bumpers in latches are typically not adjustable. On a lift gate post overslam bumpers are also used to set flushness in addition to overslam bumpers in the door latch.

Overtravel
Difference between maximum travel and release travel.

P1P2
Two points which describe the profile of a door body aperture flange when shown in section. The P1P2 flange is used to mount the body aperture seal for the primary door seal.

Panic Action
An action which may occur under panic conditions (accident, fire, etc.) when the latch is in the locked position and an attempt is made to unlock it through inside locking knob simultaneously with an attempt to open door from outside through activating outside handle. Latching system must be so designed that when outside handle is released, the latch will go automatically into unlocked position and the door may be opened from outside with the next attempt.

Part in Assembly (PIA)
A component which is shipped, included in a larger assembly is considered PIA to the larger assembly.

Pawl (Detent Lever, Hook Lever)
A mechanical element internal to a latch, which is spring biased against the ratchet such that it engages a tooth on the ratchet to prevent back rotation and hold the latch closed. The latch cannot be released unless pawl is rotated out of engagement with ratchet.

PLP
The Principal Locating Point is a key datum hole on sheet metal stampings which locates the part on the tool. The PLP has no function in the finished component, but the sheet metal tolerance is tracked relative to the PLP.

Power Lock Feature
An electrical (type) means to change the mechanical state of the latch system from locked to unlocked position. Usually performed by a power actuator consisting of gear train and output lever driven by a small motor.

Power Release
An electrical or pneumatic actuation of the pawl in a latch to open the latch (door, deck)

Pretravel
A typically small amount of travel which is designed into a system to prevent incomplete pawl engagement, or smooth operation of a disengaging feature, within the tolerances of the system.
Primary Door Latch
With respect to a back door or back door system, the latch or latches equipped with both the fully latched position and the secondary latched position.

Primary Latched Position
The fully engaged and latched position where on a correctly adjusted vehicle the door sheet metal is flush with the body, and the door ajar indicator is turned off. This position holds the latch and door inboard of the secondary or half-latched position. Pawl and ratchet are engaged on the primary tooth. Full FMVSS strength requirements apply to the primary position.

Primary Seal
A seal which generally creates a complete ring around the door or body aperture. In general the primary seal is located on a swing door, or on the body for a sliding door or lift gate. The primary seal alone could stop water and air entry but secondary seals are typically added to reduce wind noise at top, bottom and leading edge of the door.

Ratchet (Fork Bolt, Cam Tooth)
A mechanical element internal to the latch which is driven forward by the striker during closing and then prevented from back-rotation by the pawl. The ratchet then holds the striker and door / hood / deck closed.

Racetrack
A description of an oblong and generally rounded feature. For example a formed depression to surround an outside handle could be termed a racetrack, or the W1W2 surface might also be termed a racetrack.

Release Efforts of the latch
The force in Newton applied to a pawl or release lever in release direction which causes pawl to disengage from ratchet and releasing the latch to open position under seal load.

Release Lever
A lever which acts as the primary release input for the mechanism in question.

Release Mechanism
The release mechanisms are customer operated to unlatch the latch.

Release Travel
In following definitions release travel measured on the handle means total release travel of a latching system as opposed to release travel of a latch itself which is measured on a release lever of a latch or pawl.

a) Under Seal (door or lift gate closed against seal force):
The distance in millimetres or angle in degrees travelled by the lift gate handle (or release lever of a latch) from its rest position to a point at which the pawl slips off ratchet and latch unlatches under seal pressure.

b) No Seal (door or lift gate open):
The distance in millimetres or angle in degrees travelled by the lift gate handle (or release lever of a latch) from its rest position to a point at which the ratchet is free to rotate.

c) Earliest Release
Minimum theoretically possible release travel required to unlatch the latch in case where all components (tolerance stack-up) and factors (forces and friction) contributing to the travel are at worse condition reducing the travel.

d) Latest Release
Maximum theoretically possible release travel required to unlatch the latch in case where all components (tolerance stack-up) and factors (forces and friction) contributing to the travel are at worse condition increasing the travel.

Reliability
The percent of population of the product which performs its intended function(s) within a window of performance that meets or exceeds customer expectations, for a specified period of time or mileage, under operating conditions encountered.

Remote Control
A device which operates a mechanism from a distance. Commonly used to describe an inside door handle.

Remote Keyless Entry RKE
The remote keyless entry is an electrical device which engages the actuator to lock/unlock the latch. The fob containing the electrical device is typically located on key chain remote to the vehicle.

Remote Release
Latch release typically by cable at a position not adjacent to the opening element (hood, deck). Deck latch release is alternatively released electrically by a motor driven actuator or solenoid.

Seal Force
The sum of all forces exerted by weatherstrips, windhose, and door bumpers when door (lift gate) is in fully closed position but with the striker removed. measured at a point on the outer panel in line with the door latch.

Secondary Catch
A mechanical engaging feature used on hood latches to hold the hood down following primary latch release. The secondary latch must be released from the front of the vehicle to prevent accidental release while driving. The secondary catch is commonly integrated onto the primary latch such that it engages the same striker.
An integrated secondary simplifies installation and adjustment at the assembly plant. The secondary catch might also be integrated to the hood striker such that it engages the cross member on the body. Alternatively the secondary catch can be supplied as a separate assembly requiring separate alignment following the main latch and striker alignment.

**Secondary Latched Position (Safety Position)**
For hood latches see Secondary Catch. On a door or lift gate latch a second tooth is included on the ratchet profile to provide engagement by the pawl. When latched in this position the door is also termed “ajar” or “half-latched”. This latched position must meet specified FMVSS strengths which are less than in the primary position. The secondary position prevents an improperly engaged latch from popping to a full open position, and prevents injury from door rebound following a weak slam.

**Shut Bevel Angle**
An angle between the normal surface of door inner panel and latch mounting surface or shut bevel face.

**Shut Bevel Face (Rabbet)**
The step or offset in the pillar face of the door panel which receives a similar step in the body pillar and serves to conceal the clearance between door panel and pillar. In lift gates “D-ring” replaces “pillar” and “lift gate” replaces “door” in the above definition.

**Sliding door**
A door typically used on full size and minivans where door does not open by pivoting alone. Typical tracks direct door to slide on rollers roughly parallel to side of vehicle.

**Sliding wedge**
A stabilizing element which is used to match an incoming striker or door or gate, which is allowed to move such that it adjusts to the final rest position and provides an anti-chucking feature. The wedge angle must be selected to provide adequate height variation to match the engaging component, but shallow enough not to squirt out when the engaging element exerts force by trying to move.

**Solenoid**
A power actuating element utilizing an electromagnet to pull the core shaft inward and provide a mechanical motion for function actuation.

**Sones**
Loudness of a 1000 cycles per second (cps) tone at 40 dB intensity.

**Stabilizer**
A general term applied to specialty hardware used to prevent door chucking on rough road conditions. A sliding wedge block, or nesting pin and pocket are commonly used for this purpose.

**Striker**
A device which is typically mounted rigidly to the body to facilitate latch engagement and hold the door or element in the closed position. The striker and latch must engage to provide the required closed latch strength. For hood latches the striker is commonly mounted to the hood while the latch mounts to the front cross member.

**Swing Line**
A curve in a plane normal to a hinge pivot axis of the door (lift gate), created by connecting all positions of a point in the latch when the door is rotated to open position. In most cases it is an arc of a circle with a center on pivot axis of a hinge.

**Test**
Exercising the product, under specified conditions, in accordance with a test procedure, collecting quantitative data via test instrumentation, and noting the results.

**Transverse Strength**
The strength of a side door latch or side door system withstanding a push in the direction across the width of the car (i.e. transverse), in the direction of door opening. Generally this term is applied to other latches with alignment in the vehicle other than the typical side door, where the term then applies to a force applied to separate the latch and striker in the direction of door opening. High transverse strength is required to prevent door opening when impacted from the inside by a mass or internal member following initial vehicle impact and deformation.

**Trim Panel**
A typically plastic panel which covers the painted sheet metal of large sections of door or body. The trim is used to mount ergo switches as required and on doors often includes positions to grab and move the door.

**Undogging Action**
An automatic action which causes the latch mechanism to go from locked position to unlocked position when the door passes from open to safety position or from safety position to latched position. In a non free wheeling type latch undogging also occurs when the inside remote handle lever is actuated.

**Unlatched Position**
The position of the pawl when fully disengaged from the ratchet. Ratchet is fully opened.

**Unlocked Position**
The position of actuating levers which allows the pawl to be operated through outside or inside handle.
Upper Hinge
A sliding door application roller "hinge" which guides the upper front of the door for inboard / outboard positioning only.

Upper Track
A sliding door application weldment of body in white sheet metal encompassing a downward facing channel to provide guidance for the upper hinge.

W1W2
Two points on a section of a door which describe an inner and outer ring of flat area for engagement with the body aperture seal. This surface is approximately perpendicular to the P1P2 of the body aperture.

Wedge Striker
A striker with an integrated wedging shape to engage with the latch and reduce the ability for the door to chuck. The wedge also commonly absorbs energy in a door closing slam and limits overtravel to stabilize the door more quickly.

Windhose (Seal, Windlace)
A tube or cord of fabric covered rubber or plastic attached to inside body trim around door opening.

Zero Backdrive
Zero backdrive applies to power actuators, which allow lost motion for the full travel of manual operation to prevent the additional effort of backdriving the actuator gear train and motor.

2. Acronyms, Abbreviations, and Symbols

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