

Division 8 – Doors & Windows

General

Energy conservation and sustainable design must be given thorough consideration when incorporating fenestration into the building design. Building fenestration shall comply with State Energy Code and ASHRAE 90.1.

Energy Efficient Exterior Openings shall comply with minimum thermal ratings, based on ASTM C1363. Openings are to be fabricated and tested as fully operable, thermal insulating door and frame assemblies.

Provide documentation for products indicating percentages by weight of postconsumer and pre-consumer recycled content.

For adhesives and composite wood products, Contractor shall supply documentation indicating that product contains no urea formaldehyde.

Materials shall comply with VOC limits of authorities having jurisdiction. For adhesives and sealants, Contractor shall supply documentation including printed statement of VOC content.

Field quality control and testing is to be specified by the project Design Professional.

Submit for each type of product indicated, construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

Submit manufacturer's environmental documentation and applicable sustainability program credits that are available to contribute towards a LEED rated project certification.

Steel Doors and Frames

Hollow metal doors and frames shall comply with National Association of Architectural Metal Manufacturers ANSO/NAAMM HMMA 861-06 "Guide Specifications for Commercial Hollow Metal Doors and Frames", and must also comply with ANSI UL -10B, 10C and 1784. Fire rated door assembly units shall comply with NFPA 80, 101 and must be labeled and listed by UL (Underwriters Laboratories) or Intertek.

Standard hollow metal work shall be fabricated according to NAAMM HMMA 802-07.

Obtain hollow metal work through a single source from a single manufacturer.

Verify actual dimensions of openings by field measurements before fabrication.

Exterior doors shall be no less than sixteen (16) gauge galvanized metal with (14) gauge, or heavier, one piece welded frame. Heavier door frames shall be considered by the design professional for doors with heavy usage or over 7'-0' in height. All frames shall be heavily reinforced at hinge, strike and closer locations. Exterior frames shall be galvanized to prevent rust and corrosion. The top channel of each metal door shall be turned web up, to avoid a dirt pocket or moisture trap. Louvered doors and full glazed doors shall have twelve (12) inch bottom rails.

Interior doors shall be no less than sixteen (16) gauge metal with (14) gauge one piece welded frame. Heavier door frames shall be considered by the design professional for doors with heavy usage or over 7'-0' in height. Louvered doors and full glazed doors shall have twelve (12) inch bottom rails.

Knockdown frames are generally prohibited; however, such frames may be used in movable partitions or where it is not feasible to install one-piece welded frames.

Hollow metal doors shall carry the standard industry warranty. Warranty is to include the re-hanging of doors and finishing at no additional cost to Texas Tech.

Flush Wood Doors

Flush wood doors shall comply with Window and Door Manufacturers Association (WDMA) I.S. 1A-2011.

Unless specified otherwise, interior doors shall be solid core wood doors with wood veneer faces or factory finished. All doors are to be installed with hollow metal frames.

Face veneers at all interior wood doors shall be flush type, solid core, stain grade hardwood. The Design Professional and TTUS Project Manager will determine species, grade, color, and cut. Exposed vertical edges are to be the same species as faces.

Obtain flush wood doors from single manufacturer and single supplier.

Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.

Fire-Rated wood doors shall comply with NFPA 80 and be listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

Do not deliver or install doors until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

Specify WDMA I.S.1A-2011 performance grade as heavy duty unless specified otherwise. Specify doors for public toilets and restrooms to be extra heavy duty.

Plastic laminate if specified shall conform to NEMA HPDL.

Interior wood doors shall carry a lifetime warranty by the door manufacturer. The warranty shall include veneer delamination and warping.

Submit manufacturer's standard warranty form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship for the life of installation. Failures include, but are not limited to; Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section; telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span. Warranty shall also include installation and finishing of replacement doors.

Access Doors

Provide access doors where indicated and at the following locations:

1. In walls to provide access to valves, reset buttons, controls manometers, plumbing fittings at toilets, mechanical filter banks, mechanical access hatches, areas requiring work access for unit replacement and other areas requiring access for optimal operation and maintenance of equipment or fittings.
2. In ceilings to provide access to valves, duct dampers, fire and smoke dampers, meters, registers, HVAC filter units, remote duct dampers, remote fire dampers, remote electrical junction boxes, access hatches and other areas requiring access for optimal operation and maintenance of equipment or fittings.

Specify fire-rated access doors where required in fire-rated assemblies.

Install doors flush with adjacent finish surfaces or recessed to receive finish material.

Specify for each door face material, a product submittal of at least 3 by 5 inches in size, in specified finish.

Obtain each type of access door and frame from single source from single manufacturer.

Aluminum Framed Entrances and Storefronts

Entrances shall comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines, TAS, TDLR, and ICC/ANSI A117.1.

TTU standard is wide stile doors.

Pairs of double doors shall have a removable mullion with lock strike unless approval is given by Texas Tech to deviate from this requirement.

Glass in entrances and storefronts shall be fully tempered (FT) safety type, tinted with low E coatings.

Entrances will be designed to withstand wind loads per FM Global's recommendations.

Specify that the installer will be a manufacturer's authorized representative who is trained and approved for installation of units required for this project. References shall be provided upon request.

Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

Submit manufacturer's standard warranty form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship for 5 years from substantial completion or per manufacturer's standard warranty whichever is greatest.

Obtain aluminum framed entrances and storefronts from single manufacturer and single supplier.

Aluminum Windows

Provide fixed non-operable aluminum window assemblies throughout the project. The TTU campus standard is EFCO Series 6600 or approved equal with Tech Ivory or clear anodized aluminum finish. Operable windows will only be specified per the Owner request.

Specify compliance with AAMA/WDMA 101/I.S.2/NAFS, "North American Fenestration Standard Voluntary Performance Specification for Windows, Skylights and Glass Doors," for definitions and minimum standards of performance, materials, components, accessories, and fabrication. Comply with more stringent requirements if indicated.

Specify compliance with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.

Verify aluminum window openings by field measurements before fabrication and indicate measurements on Shop Drawings.

Security screens are NOT required.

Applied muntins are typical on all TTU projects that meet the Spanish Renaissance design.

Windows in student sleeping rooms shall have window sills lower than 30" A.F.F.

Provide aluminum windows, including anchorage, that allow for thermal movements resulting from change in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components and glazing, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculations on the surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

Specify an installer acceptable to aluminum window manufacturer for installation of units required for this Project. References shall be made available upon request.

Specify a manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.

Obtain aluminum windows of each type through one source from a single manufacturer.

Submit manufacturer's standard warranty form in which manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period. Covered failures shall include, but are not limited to, failure to meet performance requirements, structural failures including excessive deflection, water leakage, air infiltration, condensation infiltration, deterioration of metals or other materials, deterioration of metal finishes beyond normal weathering, and failure of insulating glass. The minimum warranty periods shall be:

1. Window: 3 years from date of Substantial Completion.
2. Glazing: 10 years from date of Substantial Completion.
3. Metal Finish: 10 years from date of Substantial Completion.

Warranty shall certify that all work is in accordance with the Contract Documents and shall contain a statement that should any defect develop during the guarantee period, caused by improper workmanship or materials, such defects will be repaired or windows will be replaced at no expense to Texas Tech.

Window units shall generally be of anodized Aluminum or with a Kynar coating to match campus standard "Tech Ivory". Only commercial grade "C" or heavy commercial grade "HC" are acceptable.

A window mock-up is required for each type of window. In addition to window mock-ups, it will be required that after the first window has been installed by the regular work crew, it shall be inspected and tested to ensure full compliance with approved shop drawings, and with all related standards and specified requirements, before the remaining windows are installed. The Architect, General Contractor,

Sub-Contractor, and related trades, together with the window manufacturer's representative will be required to be present at this first installation, and be expected to give a written approval before proceeding further.

Finish Hardware

The purpose of this section is to standardize, as much as possible, the finish hardware throughout the university campus, using high quality products that conform to the majority of the existing campus hardware. Therefore, proposed exceptions to the following listed requirements will be considered only when the architect/contractor can demonstrate that the exception will better fill the needed requirements and will conform to the standards established by the university. All hardware submissions including miscellaneous items, exceptions from, or additions to the standards set forth will require the approval of the Managing Director of Physical Plant and the TTUS FP&C Vice Chancellor. The hardware supplier shall furnish submittal data on each type of hardware with the hardware schedule.

For door hardware on doors in an accessible route, comply with Texas Accessibility Standards (TAS) and the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.

Specify to submit samples for door hardware of each type required.

Obtain each type of door hardware from a single manufacturer.

Specify electric/electronic hardware for access doors that conforms to the security protocols of TTU University and TTU Police.

Refer to TTU Operating Policies and Procedure 61.14 "*Electronic or Keyless Locking Systems*" for more specifics.

Specify automatic door operators at main entry doors and entry vestibule doors as needed.

All cylinders shall be Sargent and keyed into factory-registered Grand Master key System with a restricted keyway.

All locksets in new buildings and in the renovation of existing buildings where the doors and locks are being changed shall be of mortise type. The locksets shall meet the requirements of 28 CFR Part 36, Nondiscrimination on the Basis of Disability by Public Accommodations and in Commercial Facilities; Final Rule, 4.13.9. The only exception to the use of mortise locks will be in small renovation projects or re-keying projects where the doors are not being changed or where existing Sargent cylindrical locks can be keyed to the Sargent restricted keyways. Cylindrical locks other than Sargent will be replaced with Sargent cylindrical locks keyed to the Sargent restricted keyway or with mortise locks.

1. Mortise locks shall be limited to the following with lever handles required:
 - a. Sargent 8200 series with LW1 - L trim.
 - b. Corbin/Ruswin ML2200 series with NSR trim.

Other manufacturers' mortise locks will be considered on a model-to-model basis, subject to approval by the University Security Systems Manager.

Cylindrical locks shall be limited to Sargent 10 line.

Auxiliary dead bolt locks shall be limited to Sargent 4870 Series, US10/32D, 74, 75, 76, 77, 78, 79.

Dead bolt for aluminum doors and sliding doors shall be equipped as follows:

1. Wide stile aluminum swinging doors, Adams Rite MS 1850A with 4000 series strike. Color to be US-28 (Satin Aluminum) or matching color.
2. Sliding doors, aluminum or wood, Adams Rite MS 1850A-505 with 4000 series strike. Color to be US-28 (Satin Aluminum) or matching color.

Specify pull handles to meet requirements of 28 CFR and will be provided for sliding doors.

The finish on locksets will depend upon the function of the building and/or space served, but will generally be either of:

1. US10 (Bronze).
2. US10B (Oxidized Bronze, Oil Rubbed)
3. US32D (Stainless Steel).
4. US26D (Satin Chrome)

Other finishes may be considered, but will be subject to approval by the owner.

The function of mortise locks will be standardized as follows:

	Sargent	Corbin/Russwin
	8200	ML2200
Service/Storeroom	04	57
Office	55	51
Passage	15	10
Dormitory	25	65
Classroom	37	55
Entrance	43	67
Bathroom	65	20

The function of Sargent 10 line cylindrical locks will be as follows:

Service/Storeroom	10G04
Office	10G05
Passage	10G15
Dormitory	10G25
Classroom	10G37
Bathroom	10G65

Other functions desired, but not listed, shall be selected from the same series designated in sections (6) and (7), and shall have the approval of the Managing Director of Physical Plant.

General guidelines for function selection:

1. Operation of the inside lever shall always automatically retract all locking mechanisms to allow exit from the space. The only exceptions are dead bolt locks operated by thumb turns and/or keyed cylinders on doors between rooms and not classified as exit doors.
2. Limited access areas such as equipment storage areas, stock rooms, mechanical equipment rooms, etc., should be equipped with locks with a rigid lever function to ensure that the door is always locked when closed and is operable from the outside with key only and inside by the lever. These doors may or may not be equipped with door closers, depending on room function. All mechanical equipment rooms and custodial rooms shall be equipped with rigid outside lever function. The outside lever shall also be knurled. These rooms shall also be equipped with a door closer.
3. Areas requiring higher security should be equipped with locks having dead bolt functions and without toggle or push button options. The locks should be locked or unlocked from the outside by key only with the inside locked by thumb turn and unlocked by inside lever.
4. Classroom lock functions should allow the door to be locked or unlocked by key only from the outside, no lock function from the inside.
5. Office locks should be more flexible and should be the only areas in which toggle or push button options can be used. Guard bolt should deadlock the latch bolt. Separate dead bolt action can be optional.

Doors not normally used by the public and that lead to hazardous areas such as loading platforms, mechanical or electrical rooms, or to other areas that might be dangerous to a blind person, must be made identifiable to the touch by a textured surface on the door handle, lever, or pull. A knurled surface is preferred over an abrasive coating. NOTE: Textured surface shall NOT be provided for emergency exit doors or any doors other than those to hazardous areas.

Exit devices shall be limited to Sargent Touchbar Type, 8700, 8800, and 8900 series as the standard (using the cylinder dogging or hex key dogging feature). Crossbar type (series 90) is not acceptable. Narrow design 8300 and 8500 shall not be used unless absolutely necessary and only then with the approval of the Managing Director of Physical Plant. Concealed vertical rod series 8400 and 8600 are not acceptable. All exit devices shall be mounted using through bolts. Following are acceptable Sargent trim, finish, functions, and dogging:

Trim - STS, PTB, ET (some applications)

Finish - US10, US10B, US32D, US26D

Functions - 04, 10, 28, 63, 93

Dogging - Cylinder dogging or hex key dogging

Door closers shall be surface mounted with through bolts and limited to LCN 4041. Arms and covers shall be painted aluminum or statuary bronze. Closers will meet the requirements of 28 CFR.

Automatic door openers shall be limited to LCN 4820 Series Auto – Equalizer. Arms and covers shall be painted aluminum or statuary bronze.

All exterior entrance doors shall be installed with ball bearing hinges. A Roton Continuous Hinge is an acceptable substitute.

Where center mullions are not applicable on double doors and the doors are equipped with a lock, the inactive leaf shall be equipped with concealed, automatic, or manually operated flush bolts. Where the doors are classified as exit doors and require exit hardware, surface mounted vertical rods shall be used.

Concealed vertical rods, concealed closers, offset door hinges, and offset door pulls are not acceptable items.

Keying of buildings, areas within buildings, or individual spaces shall be designated by the building user in coordination with the University Lock Shop. All locks in new construction, renovations, or re-keying projects shall be keyed to the Sargent restricted keyway as designated by the Security Systems Manager. No exceptions will be considered for the Sargent restricted keyway. All contractor supplied locksets, exit devices and other keyed hardware shall be supplied with Sargent restricted keyway cylinders. The TTU Lock Shop shall assign those restricted keyways. The only exception to this would be in small renovation or remodel projects, with the approval of the Texas Tech University Lock Shop. All permanent lock cylinders and associated components will be removed from the hardware and delivered to the TTU Lock Shop for keying and installation by the University Lock Shop. Contractors shall use test cylinders on all keyed hardware to insure proper fit of the permanent cylinders in the hardware. Contractors shall provide temporary cylinders for security during construction.

Submit manufacturer's standard warranty form in which the manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to structural failures including excessive deflection, cracking, or breakage, faulty operation of doors and door hardware, and deterioration of metals, metal finishes, and other materials beyond normal weathering and use. The warranty period shall be three years from date of Substantial Completion, unless otherwise indicated below:

1. Exit devices: 2 years from date of Substantial Completion.
2. Manual closers: 10 years from date of Substantial Completion.

Beginning at Substantial Completion, provide twelve months full maintenance by skilled employees of door hardware installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Provide parts and supplies that are the same as those used in the manufacture and installation of original products.

Glazing

Design glass, including comprehensive engineering analysis according to ASTM E 1300 by a qualified professional engineer.

Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

Specify to allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

Provide safety glazing where required by IBC as adopted by authorities having jurisdiction.

Specify a qualified insulating-glass manufacturer who is approved and certified by a coated-glass manufacturer.

Specify a qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program. References shall be made available upon request.

Obtain insulating glass from a single source from a single manufacturer for each glazing type.

Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

Annealed glass will not be specified unless approved by Owner's Representative.

Exterior insulated glazed units (IGU) are required to meet current adopted Energy Code performance requirements as regulated by the State Energy Conservation Office (SECO).

<http://www.seco.cpa.state.tx.us/tbec/statefunded.php>

Glass for exterior insulated glazed units (IGU) applications shall be tempered. Exterior insulated glazed units are not required to be gas-filled but are to have a Low-E coating applied to the #2 surface of the exterior pane of glass. Low-E coating is to be provided with the pyrolytic application process. Consideration for sputter coated Low-E glass may be given by the FP&C Project Team if proposed glass meets aesthetic design intent characteristics relative to color, transmittance and reflectance. Exterior pane visible light reflectance shall not exceed ____%. Exterior insulated glass units are to exhibit a slight gray tint (Example: Viracon VNE 19-63 Crystal Gray). Owner will approve glass color, tint and reflectance from glazing samples and project mockups.

Submit a manufacturer's standard warranty form in which manufacturer agrees that the original glass in the windows and doors will be free from failure of the air seal or any other defects which obstructs vision through the glass or affects the insulating qualities for a period of 10 years. The guarantee shall not cover glass breakage from physical abuse, earthquake, storm, or similar causes.

Consideration should also be given to the use of tinted glass, sunshade materials, and any other devices that will prevent excessive solar gain.

Wire glass which is specified to have Underwriters' Laboratory's approval shall have the label left on the glass. Texas Tech will remove the labels after acceptance of the building. Direction of wire (i.e., horizontal/vertical or diagonal) shall be specified by the Architect.

Mirrors

Submit description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.

Submit to use a qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

Obtain mirrors from single source from single manufacturer.

Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

Submit a manufacturer's standard warranty form in which mirror manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film. Warranty period shall be 5 years from date of Substantial Completion.

Specify to install mirrors in compliance with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images and complies with ADA, and TAS.