US Army Corps of Engineers®

JAPAN DISTRICT DESIGN GUIDE

APPENDIX

APRIL 2025

VERSION 9.0
Approved for Public Release, Distribution Unlimited

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TABLE OF CONTENTS

PREFACE

In February of 2017, the first version of the Japan District Design Guide (JDDG) was put forth with a vision that it would “be a valued and often used desk reference for practicing professionals….” We are very pleased with the success of the guide and have continued our efforts to hereby put forth JDDG APPENDIX Version 9.0.

The intended purpose of this updated version is to add clarity and accuracy to the existing guide, and to expand our guidance into other areas not previously covered in the prior version. As the District’s Military Construction (MILCON) program continues to move forward with priority and urgency, this guide will continue to be a valued desk reference for practicing professionals who are performing work for the District.

Practical use of the guide will not only help clarify the District’s expectations of designs and their respective submittals, but more importantly, your efforts to use the guide will have an immediate effect and will help us in raising the standard of our quality.

Our design partners have our full support! As you prepare designs, we urge you to reference the guide—examine, highlight, and mark it up—and when errors or omissions are observed, we want to hear about it. Please send us your comments via email at: JDDG@usace.army.mil.

Together with our design partners, we will build and deliver a world-class program!

CHANGE LOG FOR JAPAN DISTRICT DESIGN GUIDE APPENDIX VERSION 9.0

1. **COVER PAGE**: Updated publication date and annotation to “APRIL 2025” and “VERSION 9.0”
2. **PREFACE**: Updated version to 9.0.
3. **TABLE OF CONTENTS and APPENDIX:**
    - Removed Appendix E. Adjusted Appendix numbering.
    - Added new Appendix Sections:
        - APPENDIX F, "RESIDENTIAL MOISTURE PREVENTION: ENGINEERING GUIDELINES (ECIFP)"
        - APPENDIX G, "TECHNICAL SERVICES PROCESS GUIDES."
4. **BOOKMARKS:** Updated.

US Army Corps of Engineers®

Japan District Design Guide (JDDG)

https://www.poj.usace.army.mil/Business-With-Us/References/

Inquiries to: JDDG@usace.army.mil

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APPENDIX A

FIRE RATED GYPSUM BOARD ASSEMBLIES

This appendix provides authorization and documentation for two Japanese wall assemblies that are acceptable for use in Japan District projects. Documentation includes the following:

- Acceptable use memo from Mark Jones
- A21 – Yoshino Fire Resistant System Installation Instructions, English
- A21 – Yoshino Fire Resistant System Installation Instructions, Japanese
- B15 – Yoshino Fire Resistant System Installation Instructions, English
- B15 – Yoshino Fire Resistant System Installation Instructions, Japanese

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, JAPAN DISTRICT
UNIT 45010
APO AP 96343-5010

December 12, 2017

Dear Japan District Architect-Engineer Partners:

The purpose of this letter is to provide guidance for specifying fire-rated wall assemblies for U.S. funded projects in Japan utilizing Japanese manufactured gypsum board and materials.

The Japan District has reviewed two Japanese wall assemblies that have been tested in accordance with the ASTM E119 Standard Test Methods for Fire Tests for Building Construction and Materials. Based on the test results, the following assemblies are deemed suitable for U.S. Army Corps of Engineers projects in Japan.

a. MLIT Certification Numbers FP0606NP-0197/0198 for 2-hour gypsum board fire-rated assemblies.

   Although the certificate states, "1-Hour Fire Resistant Structures," this assembly successfully passed endurance and hose stream tests for 2-hour fire-rated construction. Copies of the Yoshino Gypsum Co. LTD fire endurance test dated May 11, 1978 and the Japan Gypsum Industry Association hose stream test dated August 29, 1999 are available upon request.

b. MLIT Certification Numbers FP0606NP-0174/0175 for 1-hour gypsum board fire-rated assemblies.

The original Japanese Installation Instructions and Certificates for the wall assemblies and the English translated versions are enclosed with this letter.

These assemblies are offered as options to UL Listed assemblies and must be installed in strict accordance with the MLIT Installation Instructions.

Should you have any questions or need further information, please contact Mr. John Lopes via email at John.Lopes.civ@usace.army.mil or direct at 011-81-46-407-3475 (DSN 315-263-3475).

Sincerely,

JONES.MARK.C.1095244889
Digitally signed by JONES.MARK.C.1095244889
Date: 2017.12.12 13:16:54 +09'00'

Mark C. Jones, P.E.
Chief, Engineering Division
US Army Corps of Engineers, Japan District

Enclosures

Yoshino Fire Resistant System

A21

1 Hour Fire Resistant Structure Accredited by Minister of Land, Infrastructure, Transport and Tourism

FP060NP-0197

FP060NP-0198

Installation Instructions

[September 2012 version]

Yoshino Gypsum Co., Ltd.

Note: This is unofficial trial translation by JED to understand the contents. So, please follow the official Japanese version issued by Yoshino Co., Ltd.

To construct safely and correctly

When a dry type fire resistant sound insulating wall is constructed as party wall of multiple dwelling house (condominium, etc.), it is obligated to comply with Ordinance of Ministry of International Affairs and Communications No. 40 based on “Special Standard [Fire Services Act Enforcement Ordinance, Article 29-4]”, and that detailed provisions of Fire Station Prevention Section Notice No. 188 and 500. That Notice No. 500 specifies “it is limited to when construction control system is arranged” as construction condition.

“Being limited to when construction control system is arranged” means that the following requirements are fulfilled:

1) Construction method of dry type wall is specified by construction specification, etc. made by the maker.
2) Those who are assigned as supervisors, etc. on construction sites have completed technical training provided by the maker.
3) Construction status is checked with self-inspection and the result is stored.

“Standard Construction Instruction” corresponds to the above 1.

Regarding the above 2, in order to thoroughly implement “construction control of Fire Resistant, Sound Insulation System”, Yoshino Gypsum Board has an established system that <Tiger Fire Resistant Sound Insulation Structure Construction Study Group> or other equivalent organizations provide technical training like practical skill training which assumes on-site construction and award a certificate of completion <license> to those who completed the training.

The above mentioned is intended to arrange the construction control system to ensure Fire Resistance Performance of dry type party wall at construction sites. Since this concept is required for construction of Fire Wall except party wall, it shall be ensured to implement construction by following contents of this “Standard Construction Instruction”.

Others:

1. Make sure to read this “Standard Construction Instruction” carefully before construction and understand it well.
2. Keep the “Standard Construction Instruction” in place to check it at any time throughout the construction.

Contents

1. General Rules

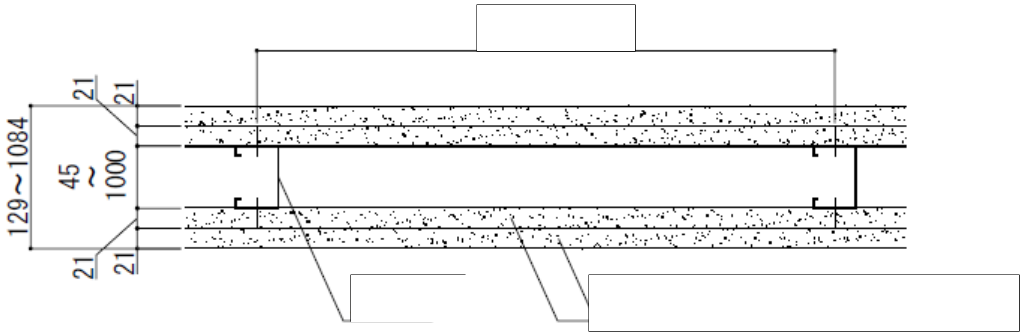
1.1 Scope

This Standard Construction Instruction applies to Yoshino Fire Resistant System A21.

Yoshino Fire Resistant System A21

1 Hour Fire Resistant Structure　Accredited by Minister of Land, Infrastructure, Transport and Tourism
FP060NP-0197 (Where sound insulating materials are not inserted in hollow parts)
FP060NP-0198 (Where sound insulating materials are inserted in hollow parts)

Horizontal section (specification of accreditation where sound insulating materials are not inserted in hollow parts)



*Standard stud interval shall be 455 mm.
*A shape (45, 50, 65, 75, 90 or 100 type, etc.) of chosen stud according to a wall height differs.
*The drawings in this document indicates nominal dimension value of each component.

1.2 Full dissemination

When constructing Yoshino Fire Resistant System A21, make sure that all workers are informed and understand this Standard Construction Instruction through a seminar or other ways.

1.3 Construction

Contractors must ensure to construct accurately according to this instruction. When unwritten things in the instruction or questions arise, the contractors need to discuss with Yoshino Gypsum Co., Ltd. and consider construction methods.

1.4 Report

When construction is completed, contractors need to report to a supervisor of the prime contractor for construction and have inspection.

2. Safety measure

Safety comes first at works on sites and each one shall be aware of it and act accordingly. If there are dangerous procedures or safety control can not be secured, workers need to even stop working, get united, and give a top priority to safety control. Completing the construction without injuries until the end shall be a principle.

<Notice to Tiger Board type>

* Yoshino Gypsum Co., Ltd. does not guarantee the performance if it is used for purposes except the specified application.

* When cutting the board for construction, pay attention to collecting dust, etc. and use dust prevention cutter or dust collecting circular saw. Also, for dusts generated at works like sanding, it is recommended to wear dust prevention mask or safety glass.

*If many layers are piled up for storing, it may fall down.

*Regarding disposal of waste materials of Tiger Board type and cleaning drainage, be careful not to cause environmental pollutions.

3. Packaging, transportation, lifting and storage of boards

3.1 Packaging

For storage packaging, a stack usually consists of 60 sheets of reinforced gypsum boards (21 mm).

3.2 Transportation

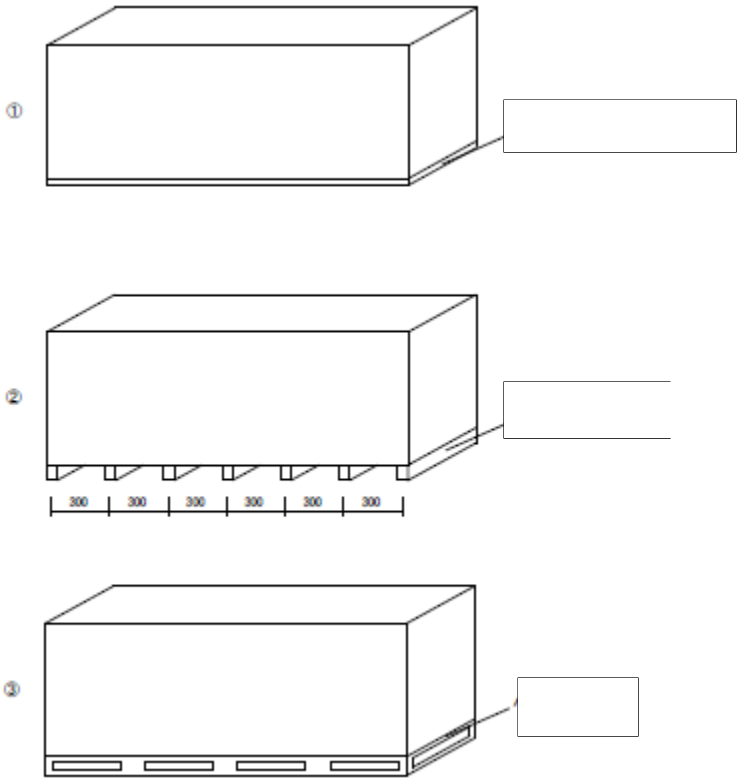
Transportation of reinforced gypsum boards, etc. shall be discussed with a supervisor of the prime contractor for construction and be implemented based on on-site transportation plan.

3.3 Lifting

Lifting to each floor shall be done with a lift provided on site and follow on-site lifting criteria.

3.4 Storage

1) Place the boards evenly not to fall down or get chipped.
2) Put a distance of at least 1 m from walls.
3) Do not put on any slope or marked areas.
4) Do not put on uneven surface or wet place. If water may leak from upper floors, cure with sheet, etc. in advance.
5) Store reinforced gypsum boards, etc. on stands with uniform height, and edges of the boards shall not be outside the stand like the following drawings to prevent boards from waving or getting wrapped. Also, top board of each pile shall be placed facing down.



(*In case of long boards, (1) or (3) shall be implemented)

6) When 2 stacks are piled up, blocks of first and second layer stack shall be aligned.

7) Do not use reinforced gypsum boards, etc. as stepping-stool.

3.5 Disposal of remaining materials, cleaning

Remaining reinforced gypsum boards and other remaining materials shall be collected at designated places on each floor and the places shall be cleaned every day.

4. Materials

4.1 Major component

4.1.1 Reinforced gypsum board (GB-F(V))

Product name: Tiger Board Type Z (hereinafter referred to as TBZ)

1) Specification　Non-combustible NM-8615(GB-F(V)), JIS A 6901
2) Dimension
   Thickness　21 mm
   Size (standard)　606 mm x 1,820, 2,420, 2,730 mm
3) Performance
   Specific gravity　0.75 or more
   Moisture content　3 % or less

4.1.2 Top and bottom runner

JIS G 3302 or JIS G 3313, etc.

⊏ 45 to 1,000 x 30 to 75 x 0.4 mm or more

4.1.3 Stud

JIS G 3302 or JIS G 3313, etc.

⊏ 45 to 1,000 x 45 to 75 x 0.4 mm or more

□ - 45 to 1,000 x 40 to 75 x 0.4 mm or more

Selection sample of wall heights and studs (when using JIS A 6517 studs and bracing)

Wall height up to 2.7 m : ⊏ 50 x 45 x 0.8 mm

Wall height up to 4.0 m : ⊏ 65 x 45 x 0.8 mm or ⊏ 75 x 45 x 0.8 mm

Wall height up to 4.5 m : ⊏ 90 x 45 x 0.8 mm

Wall height up to 5.0 m : ⊏ 100 x 45 x 0.8 mm

4.1.4 Bracing (use the followings when providing as necessary)

JIS G 3302 or JIS G 3313, etc.

⊏ 19 to 25 x 10 x 0.9 mm or more

4.1.5 Glass wool, etc. (use the followings when inserting as necessary)

Glass wool: JIS A 6301, JIS A 9504 or JIS A 9521

Density 10 kg/m^3 or more, Thickness 12 mm or more

Rock wool: JIS A 6301, JIS A 9504 or JIS A 9521

Density 10 kg/m^3 or more, Thickness 25 mm or more

4.2 Sub-constituent material

4.2.1 Fixing pin for runner

Concrete nail: Ø 2.0 mm or more x 10 mm or more

Buffer pin: Ø 2.0 mm or more x 10 mm or more

And other anchor piece for fixing, etc.

4.2.2 Stud spacer (use the followings when providing as necessary)

Board of 0.5 mm or more thick specified by JIS G 3302 or 3313, etc.

4.2.3 Tapping screw, staple, etc.

1) Tapping screw that is treated rust prevention

Ø 3.5 mm or more x 32 mm or more

2) Staple that is treated rust prevention

Staple for fixing top layer TBZ　4 mm or more (W) x 32 mm or more (L)

Staple for fixing glass wool, etc.　4 mm or more (W) x 16 mm or more (L), etc.

(Spindle pin (25 mm or more in length) is also acceptable for fixing glass wool, etc.)

4.2.4 Adhesive

Inorganic adhesive “Tiger Tora Board” (made by Yoshino Gypsum Board Co., Ltd.) or vinyl acetate resin adhesive “Yoshino Sakubi Bonding”, etc.

4.2.5 Materials for joint finishes, etc. (use the followings or filling materials when providing joint finishes as necessary)

1) Joint compound (putty)
   “Tiger U Light”, “Tiger F Light”, “Tiger SP Light”, “Tiger Light”, “Tiger V Seal Putty”, “Tiger GL Putty”, “Tiger UP Putty”, “Tiger F Top Putty”, “Tiger SP Putty”, “Tiger Putty”, “Tiger Joint Cement” (made by Yoshino Gypsum Board Co., Ltd.), etc.
2) Joint tape
   “Tiger Joint Tape”, “Tiger G Fiber Tape”, etc.

4.2.6 Filling material

1) Fire resistant joint filler
   Rock wool “Tiger Rock Felt” (10 mm thick x 21 mm wide x 1,000mm long), etc.
2) Inorganic Filling material
   “Tiger Gyptight”, “Tiger Gypseal” (made by Yoshino Gypsum Co., Ltd.), etc.
3) Sealant
   Urethane system “Tiger U Tight”, modified silicone-based “Tiger Fire Resistant Sealant”, etc.

5. Working instruction

5.1 Standard construction procedure

Mark a location of wall

↓

Provide runners

↓

Position studs

↓

Provide bracing (only when providing as necessary)

↓

Side A, fill up runner joints interface with fire resistant joint filler “Tiger Rock Felt”

↓

Side A, provide underlayer boards

↓

Side A, provide top layer boards

↓

Side A, fill up joints interfaces of top layer boards (“Tiger Gpytight” or “Tiger U Tight”)

↓

Provide glass wool, etc. from B side (only when inserting as necessary)

↓

Side B, fill up runner joints interface with fire resistant joint filer “Tiger Rock Felt”

↓

Side B, provide underlayer boards

↓

Side B, provide top layer boards

↓

Side B, fill up top layer board joint interface (Tiger Gyptight” or “Tiger U Tight”)

↓

Inspection

↓

Joint and other finishes (These finishes are not essential for getting authorization for fire resistance.)

↓

Finish (This is not essential for getting authorization of fire resistance.)

↓

Inspection

↓

Delivery

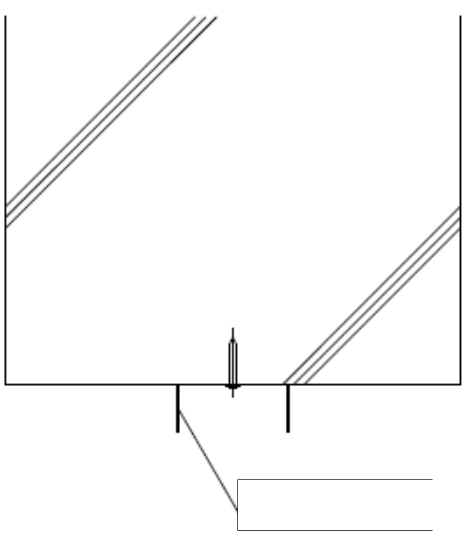
5.2 Working instruction

5.2.1 Mark

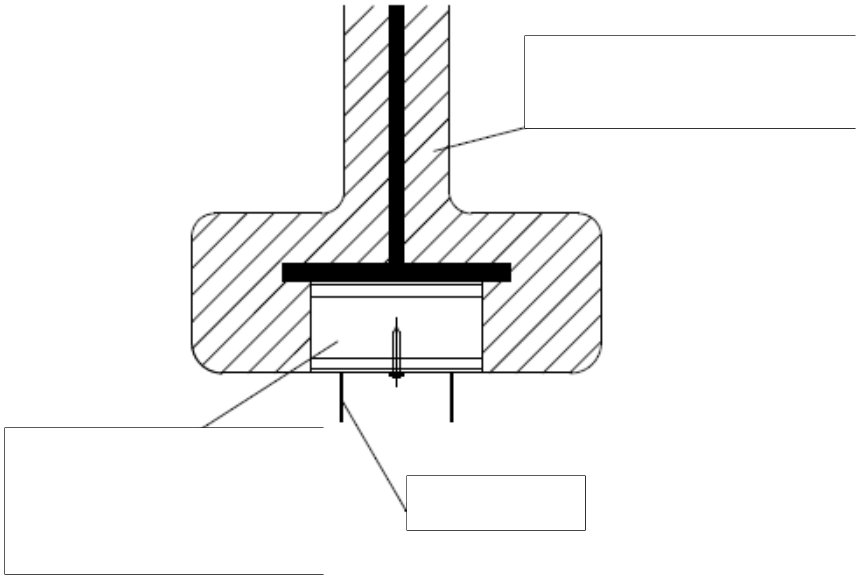
1) If a marking surface has sand, other dirt or unevenness, clean well in advance then mark.
2) Mark a center line of given partition wall from a center line or offset line of frame of the building and mark an end line of provided runner on top and bottom slab surfaces.
3) At a part where a partition is long, be careful for especially straightness.
4) After completing marking and checking locations of the marks, get approval from a supervisor of the prime contractor for construction.

5.2.2 Provide runners

1) Fix top and bottom runners to accurately marked slab surface, etc. with fixing pins, etc.
2) Insert a fixing pin at around 50mm from the end parts of runners and fix middle parts at intervals not exceeding 900 mm.
3) When providing top runner to steel beam having fire resistant coating, prior to fire resistant coating construction, fix a runner-receiving piece material by welding, etc., provide top runner and provide fire resistant coating to steel.



<Providing of top runner to ceiling slab and RC>



<Providing of top runner to steel beam>

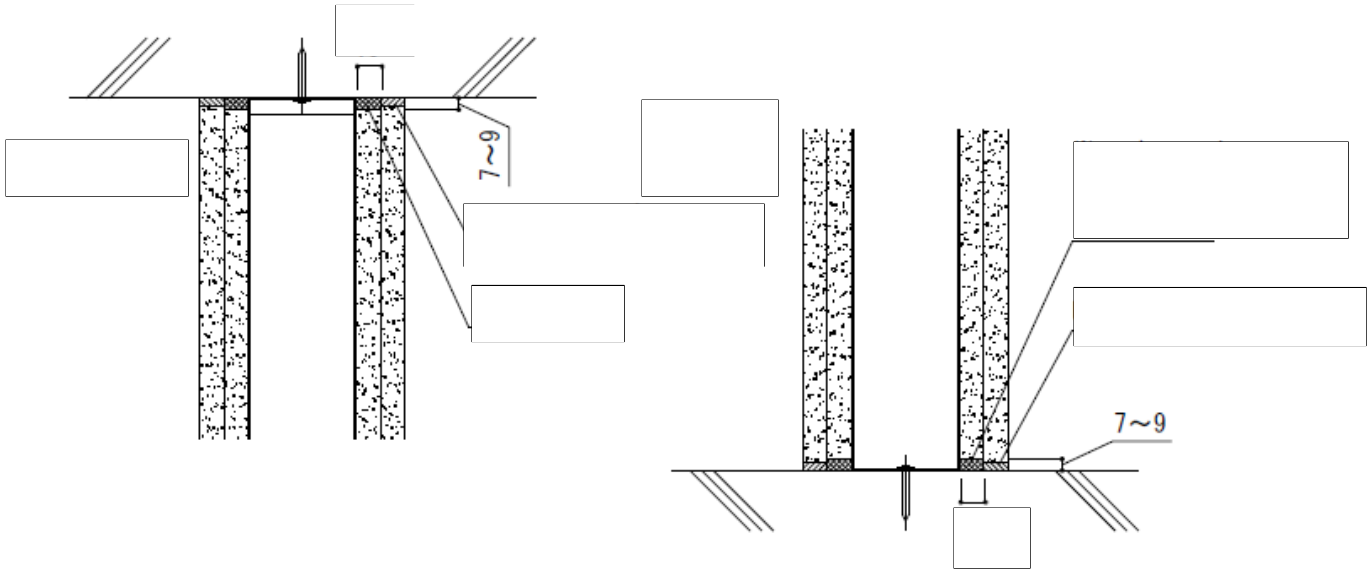
4) Top and bottom runners shall not be contacted but put a distance of around 10 mm from wall or pillar, etc.

5.2.3 Position studs

1) Cut a stud a little (around 10 mm) shorter than internal height of top and bottom runner. Choose a shape of stud according to wall height.
2) Provide a stud at intervals not exceeding 606 mm (the standard is 455 mm).
3) Provide bracing at intervals of around 1,200 mm as necessary.
4) Provide stud spacer at intervals not exceeding 600 mm.

5.2.4 Fill up with fire resistant joint filler

1) Provide “Tiger Rock Felt” (10 mm thick x 21 mm wide x 1,000 mm long) to joints interface like under slab, under beam, wall, and floor before underlaying TBZ.
2) Provide “Tiger Rock Felt” to frame surface of the building and make sure that no gap between joints is created.



*When “Tiger U Tight” is used for underlaying for floor part, make sure to use “Tiger Gyptight” for overlaying.

5.2.5 Provide underlayer TBZ

1) Provide TBZ horizontally or vertically in a manner to minimize loss.
2) Fix TBZ on stud with tapping screws while lightly pushing “Tiger Rock Felt” laid under slab, beam, or on wall, or floor. When fixing, be careful not to create a gap with “Tiger Rock Felt”. When “Tiger Rock Felt” was not used for floor parts, create a gap of approximately 5mm between TBZ and floor slab, then fix it. Fill up the gapped part with “Tiger Gyptight” or “Tiger U Tight”, etc. until the gap is eliminated. However, when not using “Tiger Gyptight” at <5.2.7 Process joints interface> at a time of providing a top layer, make sure to use “Tiger Gyptight” in the gapped part for underlaying.
3) While adjusting TBZ not to make roughness at parts contacted to studs, fix it with tapping screws at intervals not exceeding 300 mm. Indent a screw head a little deeper than TBZ surface.
4) TBZs shall be butted each other not to make a gap at joint parts.

5.2.6 Provide top layer TBZ

1) TBZ shall be provided vertically in principle and lay out not to overlap underlayer TBZ with joints.
2) Adjust TBZ at joint parts with concrete wall, etc. so that gapped parts become 5 mm or less.
3) Temporarily fix TBZ by spotting 200 g/m^2 or more of inorganic adhesive “Tiger Tora Bonding” or vinyl acetate resin adhesive “Yoshino Sakubi Bonding”, etc. then fix TBZ with staples. An interval of staples shall be within 200 mm and 1 staple or more shall be used at 1 place.
4) When providing TBZ inside a staircase or elevator shaft, consider wind pressure and earthquake and fix it on stud with tapping screws of minimal Ø3.5 mm x minimal 50 mm at intervals not exceeding 900 mm as necessary.
5) TBZs shall be butted each other at joint parts not to create a gap.

5.2.7 Finish joints interface

1) After completing providing top layer TBZ, fill up joints interface of wall, floor, under slab, or under beam with “Tiger Gyptight” or “Tiger U Tight”, etc. not to have a gap. However, when “Tiger U Tight” was used at underlayer joints interfaces of floor part, make sure to use “Tiger Gyptight”.
2) Fill up joints interfaces of spray fire resistant coating with “Tiger Gypseal”, etc. not to have a gap.

5.2.8 Insert glass wool, etc. (only when inserting)

1) After processing joints interfaces of one side, insert glass wool, etc. in hollow parts and fix it to underlayer TBZ with staples or spindle pins not to fall down.
2) Make a notch in parts connecting to spacer parts of studs, and insert glass wool, etc. inside stud and top and bottom runners not to create a gap.

5.2.9 Finish joint parts (only when finishing as necessary)

Joint parts, etc. of top layer TBZ shall be finished with joint tape “Tiger Joint Tape”, “Tiger G Fiber Tape” and joint compound (putty) “Tiger U Light”, “Tiger F Light”, “Tiger SP Light”, “Tiger Light”, “Tiger V Seal Putty”, “Tiger GL Putty”, “Tiger UP Putty”, “Tiger F Top Putty”, “Tiger SP Putty”, “Tiger Putty”, “Tiger Joint Cement”, etc.

5.2.10 Finish (only when finishing as necessary)

Finish by painting, pasting wall materials, spraying, etc.

5.2.11 Notes of other design, construction

1) This Standard Construction Instruction specifies materials that Yoshino recommends among the Certificate.
2) When providing foamed heat insulator to an external wall or under slab of top floor, provide this wall structure before heat insulating construction.
3) When providing this wall structure under RC beam, place a wall center at least around 80 mm inside from the beam edge, or embed anchor pieces for fixing top runner, etc. so as to prevent top runner fixing pins from losing retaining capability.
4) When welding parts such as runner-receiving pieces to steel beams, take care not to damage steel base materials.
5) When this wall structure crosses at right angles or runs in parallel under flat type deck plate, cut the lumps of deck at the left and right approximately 250 mm from the wall center so that the wall contacts the slab (refer to detailing drawing).
6) Regarding connection between hollow part of deck plate dent part and the top runner when providing top runner at deck plate, treat in the following method:
    I. Fill up hollow layer of deck plate dent with 150 kg/m^3 of rock wool until no gap. Next, paste “Tiger Gypseal” at rock wool part by pressing it down with a spatula not to make a gap. Coating “Tiger Gypseal” shall be thicker than top layer + under layer.
    II. Fill up the hollow layer of deck plate dent with 150 kg/m^3 of rock wool until no gap. At the both sides, fix one gypsum board (12.5 mm thick) on top layer surface material under deck plate with adhesive and staples, etc.

7) Since this wall structure is non-bearing partition wall structure, the method for processing the four side premises that external forces due to deformation of the building frame do not transmit partition walls and decides joints interface finishes, gapped part dimensions, etc. Deformation of the building frame like a pillar, beam and the like (including creep of floor slab) is not uniform and greatly differs depending on size of earthquakes, building structure or other factors. So, when deformations are predicted, it is necessary to take additional consideration of connection.
8) Do not provide electricity box or similar nature of any equipment to this wall structure.
9) When providing doors to this wall structure, fix openings reinforcement materials independently and directly on the building frame like floor, under slab, beam, etc. with fixing pins or by welding, etc.
10) Separate consideration should be given if a high-rise building swings due to strong winds, etc. and this wall structure needs squeak noise reduction measure.

6. Inspection

6.1 Self inspection

Process	Item	Point	Method	Criteria	Control method
Marking	Criteria mark	Dimension	Convex	±2.0 mm	Check Inspection
Providing of runner	Fixing pin	Interval	Convex	Within 900 mm	
Providing of stud	Perpendicularity of stud	Dimension	Plumb level	±2.0 mm	
	Layout	Interval	Convex	Within 606 mm	
Providing (underlayer) of TBZ	Butting	Dislocation between both plates	Scale, etc.	Within 2.0 mm	
	Joint	Gap	Visual check	No gap	
	Tapping screw	Interval	Scale, etc.	Within 300 mm	
Providing (top layer) of TBZ	Butting	Dislocation between both plates	Scale, etc.	Within 1.5 mm	
	Joint	Gap	Visual check	No gap	
	Adhesive	Weight	Balance or container	200 g/m^2 or more	
	Staple	Interval	Scale, etc.	Within 200 mm	
Glass wool, etc.	Inserting	Gap	Visual check	No gap	
Wall end part	Filling	Gap	Light	No transmitted light	

6.2 Witness inspection

Implement witness inspection based on instruction of a supervisor of the prime contractor for construction.

Certificate

MLIT Notification No.4465

March 13, 2009

Dear President Mr. Eiichiro Sudo of Yoshino Gypsum Co., LTD.,

The following construction method, etc. have been recognized to comply with the provisions of the Building Standard Law, Article 2, Item 7 and the enforcement order of the same Law, Article 107, Item 2 (Partition Wall (non-bearing wall): 1 Hour Rating) based on the provision of the same Law, Article 68-26, Paragraph 1 (including cases where it is applied mutatis mutandis pursuant to Article 88, Paragraph 1 of the same Law).

Note

1. Certificate number
   FP060NP-0197

2. Name of Accredited Construction Method, etc.
   Double Sided Reinforced Gypsum Board Laminated / Light Weight Steel Substrate Partition Wall

3. Contents of Accredited Construction Method etc.
   As per attachment

(Notice) Please keep this Certificate safe.

Kazuyoshi Kaneko

Minister of Land, Infrastructure, Transport and Tourism

Certificate <Fire Resistance Structure> (Where sound absorbing materials are not inserted in hollow parts)

Certificate

MLIT Notification No.4466

March 13, 2009

Dear President Mr. Eiichiro Sudo of Yoshino Gypsum Co., LTD.,

The following construction method, etc. have been recognized to comply with the provisions of the Building Standard Law, Article 2, Item 7 and the enforcement order of the same Law, Article 107, Item 2 (Partition Wall (non-bearing wall): 1 Hour Rating) based on the provision of the same Law, Article 68-26, Paragraph 1 (including cases where it is applied mutatis mutandis pursuant to Article 88, Paragraph 1 of the same Law).

Note

1. Certificate number
   FP060NP-0198

2. Name of Accredited Construction Method, etc.
   Man-made Mineral Fiber Heat Insulator Filled / Double Sided Reinforced Gypsum Board Laminated / Light Weight Steel Substrate Partition Wall

3. Contents of Accredited Construction Method, etc.
   As per attachment

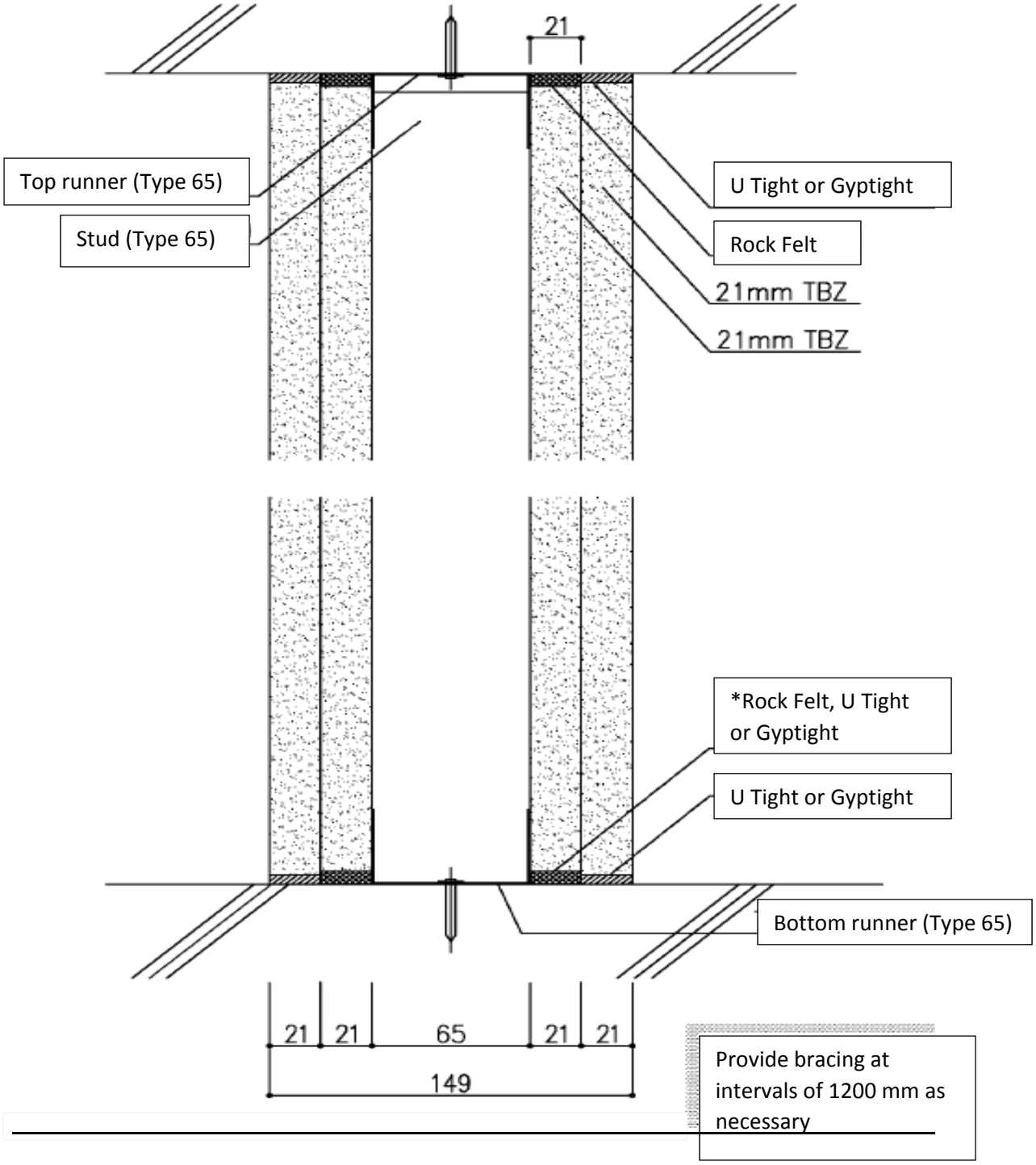
   (Notice) Please keep this Certificate safe.

Kazuyoshi Kaneko

Minister of Land, Infrastructure, Transport and Tourism

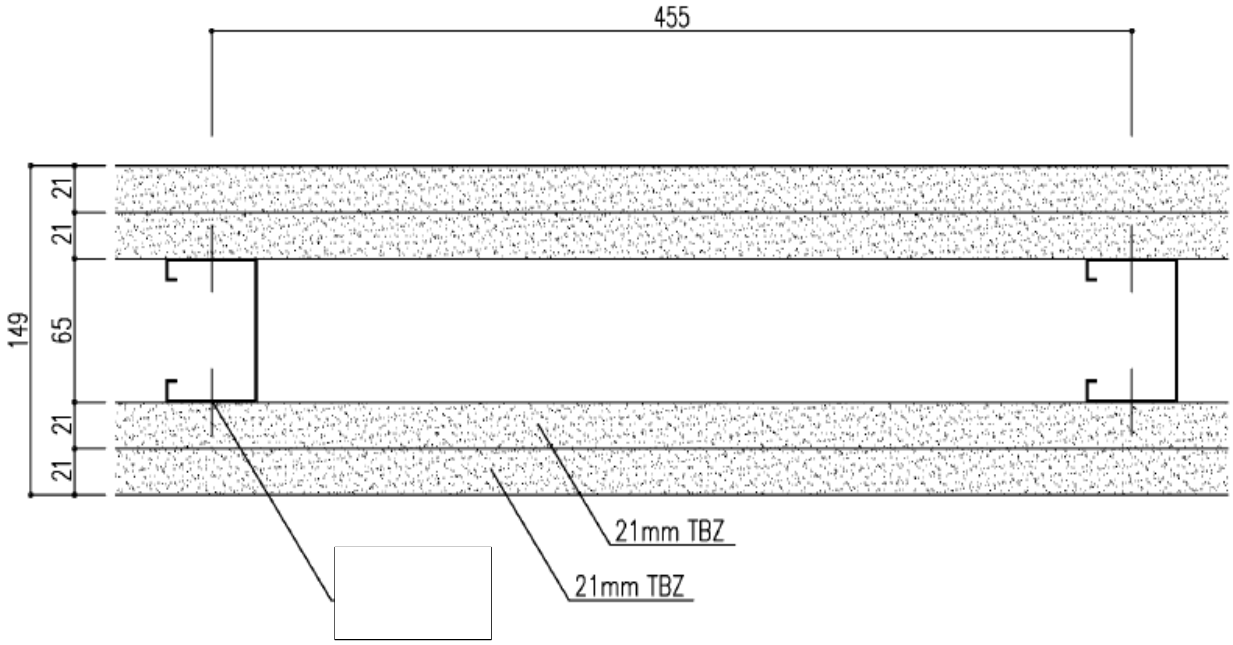
Certificate <Fire Resistance Structure> (Where sound absorbing materials are inserted in hollow parts)

Standard vertical section



*When U Tight is used for underlaying for floor parts, make sure to use Gyptight for overlaying.

Standard horizontal section



* For certification of fire resistance, stud interval shall be within 606 mm.

Standard stud interval shall be 455 mm.

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吉野耐火システム

A21

１時間耐火構造　国土交通大臣認定　ＦＰ０６０ＮＰ－０１９７
ＦＰ０６０ＮＰ－０１９８

標準施工指導書

[平成２４年９月版]

安全で快適な住空間を創る
YOSHINO
吉野石膏株式会社

吉野耐火システム　Ａ２１
標準施工指導書

Ｔ－００１－１

安全で確実に施工をしていただくために

乾式耐火遮音壁を、集合住宅（マンション等）の戸境壁等として施工する場合は“特例基準「消防法施行令２９条の４」”に基づいた総務省令第４０号、その細目を定めた消防予第１８８号及び５００号通知内容を遵守する義務があります。その５００号通知には施工条件として、「施工管理体制が整備されている場合に限る」と明記されております。

「施工管理体制が整備されている場合に限る」とは、

① 乾式壁の施工方法―メーカーが作成した施工仕様書等により明確とされていること。

② 施工現場における指導・監督等―メーカーが実施する技術研修を修了した者が選任されていること。

③ 施工状況の確認等―自主検査による確認が行われ、かつその結果が保存されていること。

の要件が整っていることです。

「標準施工指導書」が①にあたるものとなります。

②につきましては、「耐火・遮音システムの施工管理」を徹底するため、《タイガー耐火遮音構造施工研究会》またはそれに準ずる組織で、現場施工を想定した実技研修などの技術研修を実施し、研修修了者には修了証〈ライセンス〉を授与する制度を確立しております。

上記は、施工現場で乾式戸境壁の耐火性能を確保するために施工管理体制を整備することを目的としており、この考え方は戸境壁以外の耐火壁を施工する際にも必要であることから、この「標準施工指導書」の内容に従い確実に施工することとします。

その他

１．この「標準施工指導書」は、必ず施工前に注意深く読み、よく理解してください。

２．この「標準施工指導書」は、この施工全般にわたって、いつでも確認できるように保管してください。

［平成２４年９月版］

吉野耐火システム　Ａ２１
標準施工指導書

Ｔ－００１－２

目　次

［平成２４年９月版］

吉野耐火システム Ａ２１
標準施工指導書

Ｔ－００１－３

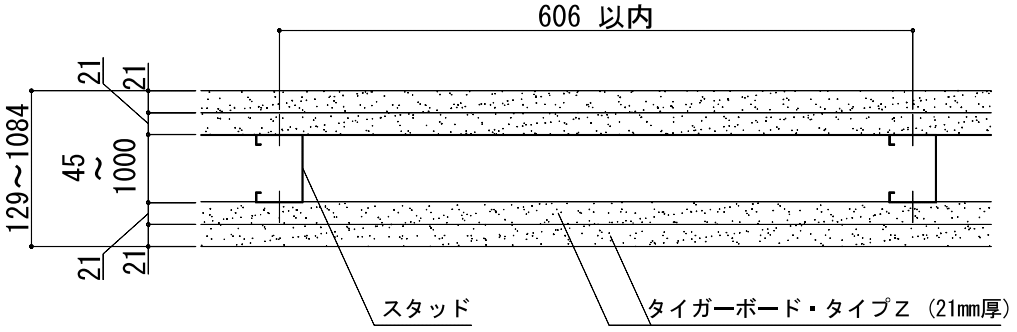
① 総 則

１－１ 適用範囲

この標準施工指導書は、吉野耐火システム Ａ２１について適用する。

吉野耐火システム Ａ２１
１時間耐火構造 国土交通大臣認定 ＦＰ０６０ＮＰ－０１９７（中空部に吸音材を挿入しない場合）
ＦＰ０６０ＮＰ－０１９８（中空部に吸音材を挿入する場合）

水平断面図 （中空部に吸音材を挿入しない場合の認定の仕様）



※標準のスタッド間隔は４５５㎜とする。
※壁高さに応じて選択されるスタッドの形状（４５形，５０形，６５形，７５形，９０形または１００形など）は異なります。
※本書の図面寸法値は、各部材の公称寸法を記載しております。

１－２ 周知徹底

吉野耐火システム Ａ２１の施工に際しては、この標準施工指導書にて事前に説明会、その他の方法で、作業員全員に周知徹底を図る。

１－３ 施工

施工業者は、この標準施工指導書によって、正確、確実に施工しなければならない。この標準施工指導書に明記されていない事項、または疑義が生じた場合は、吉野石膏（株）と協議し、施工方法を検討する。

１－４ 報告

施工業者は、工事が完了した時点で建設元請業者の監督員に報告し、検査を受ける。

②　安全対策

現場の作業は、安全を第一とし、各人が各々自覚した行動をとり、もし危険のある段取りや安全管理が徹底出来ない場合は、作業を中止してでも全員一体となって、安全管理を最優先し、最後まで無事故で工事を完了させることを基本とする。

《タイガーボード類の注意》
＊指定の用途以外にご使用の場合は性能を保証いたしかねます。
＊ボードを施工する際の切断作業では集塵などに留意し、防塵カッターや集塵丸鋸を使用してください。
　また、サンディングなどの作業で発生する粉塵に対しては、防塵マスクや安全メガネの着用をおすすめします。
＊在庫の際、積層段数が多いと荷くずれの危険があります。
＊タイガーボード類の廃材、洗浄排水の処理については、環境公害とならないようにご注意ください。

③　ボードの荷姿、運搬、揚重、保管

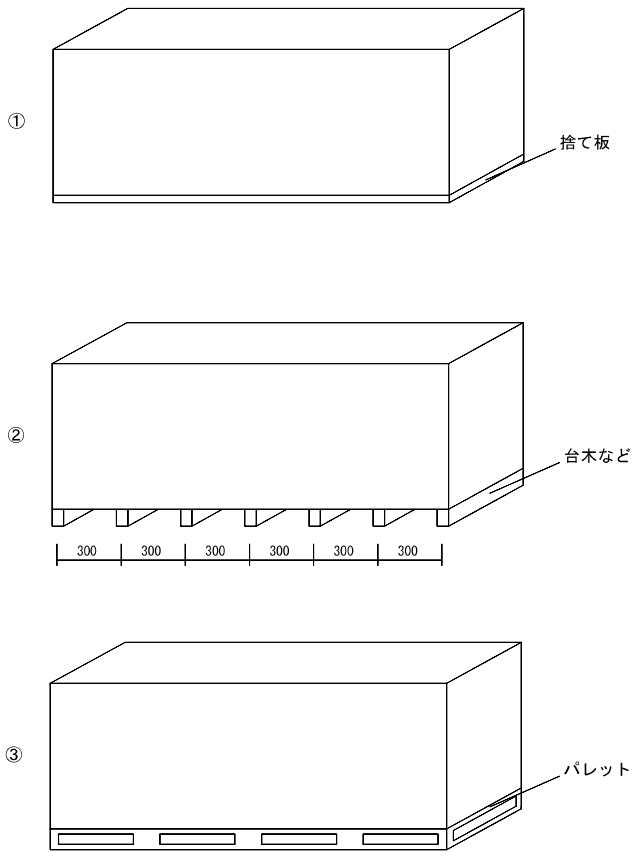
３－１　荷姿
保管荷姿は、通常、強化せっこうボード(２１㎜)で６０枚を１山としてある。

３－２　運搬
強化せっこうボードなどの搬入は､建設元請業者の監督員との打ち合わせにより､現場の搬入計画に基づいて行う。

３－３　揚重
各階への揚重は、現場設置のリフトなどで行い、現場の揚重基準に従う。

３－４　保管
（１）荷くずれ、角欠けがないように均等に置く。
（２）壁際より、最低１m以上離す。
（３）傾斜面、墨出し部には置かない。
（４）凸凹面や水漏れ部には置かない。上階から漏水の恐れがある場合は、あらかじめシートなどで養生する。

（5）強化せっこうボードなどの保管は、波打ち、そりがでないように下図のように、高さのそろった台上に保管し、ボードの縁が台からはみ出ないこと。また、各山の一番上のボードは裏面を上面とすること。



（※長尺品の場合は、①または③とする）

（6）２段積みなどを行う場合は、台木の位置を１段目と２段目でそろえること。
（7）強化せっこうボードなどを踏み台にしないこと。

３－５　残材処理、清掃

強化せっこうボード、その他の残材は、各階ごとにあらかじめ決められている指定場所に毎日清掃し、集積しておく。

④ 材 料

４－１ 主構成材料

４－１－１ 強化せっこうボード(ＧＢ－Ｆ（Ｖ））

商品名：タイガーボード・タイプＺ （ 以下ＴＢＺと称する ）

（１） 規格 不燃NM－８６１５(ＧＢ－Ｆ（Ｖ））、ＪＩＳ Ａ ６９０１

（２） 寸法

厚 さ ２１㎜

大きさ(標準) ６０６㎜×１８２０，２４２０，２７３０㎜

（３） 性能

比 重 ０．７５以上

含水率 ３％以下

４－１－２ 上部および下部ランナー

ＪＩＳ Ｇ ３３０２またはＪＩＳ Ｇ ３３１３等

⊏－４５～1,０００×３０～７５×０．４㎜以上

４－１－３ スタッド（間柱）

ＪＩＳ Ｇ ３３０２またはＪＩＳ Ｇ ３３１３等

⊏－４５～1,０００×４５～７５×０．４㎜以上

□－４５～1,０００×４０～７５×０．４㎜以上

壁高さとスタッドの選定例（ＪＩＳ Ａ ６５１７の下地材構造の場合）

壁高さ２．７ｍまで ： ⊏－ ５０×４５×０．８㎜

壁高さ４．０ｍまで ： ⊏－ ６５×４５×０．８㎜または⊏－７５×４５×０．８㎜

壁高さ４．５ｍまで ： ⊏－ ９０×４５×０．８㎜

壁高さ５．０ｍまで ： ⊏－１００×４５×０．８㎜

４－１－４ 振れ止め（必要に応じて取り付ける場合には下記のものを使用する）

ＪＩＳ Ｇ ３３０２またはＪＩＳ Ｇ ３３１３等

⊏－１９～２５×１０×０．９㎜以上

４－１－５ グラスウールなど（必要に応じて挿入する場合には下記のものを使用する）

グラスウール：ＪＩＳ Ａ ６３０１、ＪＩＳ Ａ ９５０４またはＪＩＳ Ａ ９５２１

密度１０kg/m^{3}以上 厚さ１２㎜以上

ロックウール：ＪＩＳ Ａ ６３０１、ＪＩＳ Ａ ９５０４またはＪＩＳ Ａ ９５２１

密度１０kg/m^{3}以上 厚さ２５㎜以上

４－２ 副構成材料

４－２－１ ランナー固定用ピン

コンクリート釘：φ２．０㎜以上×１０㎜以上

バッファーピン：φ２．０㎜以上×１０㎜以上

その他固定用アンカーピースなど

４－２－２　スタッドスペーサー（必要に応じて取り付ける場合には下記のものを使用する）

ＪＩＳ Ｇ ３３０２またはＪＩＳ Ｇ ３３１３等に規定する板厚０．５㎜以上のもの。

４－２－３　タッピンねじ・ステープルなど

（１）タッピンねじ：防錆処理をしたもの。
φ３．５㎜以上×３２㎜以上

（２）ステープル：防錆処理をしたもの。
上張りＴＢＺの留め付け用ステープル　　幅４㎜以上×長さ３２㎜以上
グラスウールなどの留め付け用ステープル　幅４㎜以上×長さ１６㎜以上など
（グラスウールなどの留め付け用にはスピンドルピン（長さ２５㎜以上）も使用可能）

４－２－４　接着材

無機質系接着材「タイガートラボンド」（吉野石膏製）または酢酸ビニル樹脂系接着材「吉野サクビボンド」など

４－２－５　継目処理などの材料（必要に応じて継目処理などをする場合には下記のもの、または充てん材を使用する）

（１）ジョイントコンパウンド（パテ）
「タイガーUライト」、「タイガーＦライト」、「タイガーＳＰライト」、「タイガーライト」、「タイガーVシールパテ」、「タイガーＧＬパテ」、「タイガーＵＰパテ」、「タイガーＦトップパテ」、「タイガーＳＰパテ」、「タイガーパテ」、「タイガージョイントセメント」（吉野石膏製）など

（２）ジョイントテープ
「タイガージョイントテープ」、「タイガーGファイバーテープ」など

４－２－６　充てん材

（１）耐火目地材
ロックウール　「タイガーロックフェルト」（厚さ１０㎜×幅２１㎜×長さ１０００㎜）など

（２）無機質系充てん材
「タイガージプタイト」、「タイガージプシール」（吉野石膏製）など

（３）シーリング材
ウレタン系「タイガーUタイト」、変成シリコーン系「タイガー耐火シーラント」など

⑤　施工要領

５－１　標準施工手順

墨　　出　　し
↓
ラ ン ナ ー の 取 り 付 け
↓
ス タ ッ ド の 建 て 込 み
↓
振れ止めの取り付け（必要に応じて取り付ける場合に限る）
↓
A面　ランナー取合部に耐火目地材「タイガーロックフェルト」を充てん
↓
A面　下張りボード張り付け
↓
A面　上張りボード張り付け
↓
A面　上張りボード取合部の充てん（「タイガージプタイト」または「タイガーUタイト」）
↓
B面よりグラスウールなどの取り付け（必要に応じて挿入する場合に限る）
↓
B面　ランナー取合部に耐火目地材「タイガーロックフェルト」を充てん
↓
B面　下張りボード張り付け
↓
B面　上張りボード張り付け
↓
B面　上張りボード取合部の充てん（「タイガージプタイト」または「タイガーUタイト」）
↓
検　　査
↓
継 目 部 そ の 他 の 処 理　（耐火認定上必須の処理ではありません）
↓
仕　上　げ　（耐火認定上必須の処理ではありません）
↓
検　　査
↓
引　き　渡　し

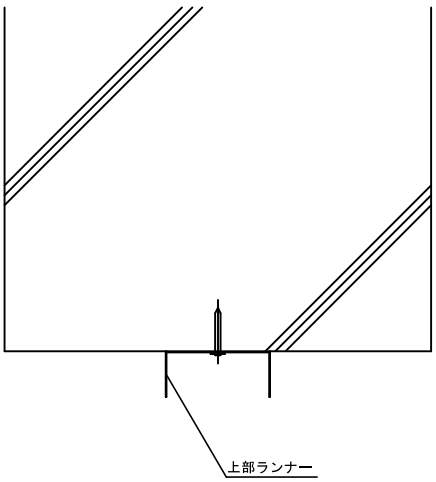
５－２　施工要領

５－２－１　墨出し

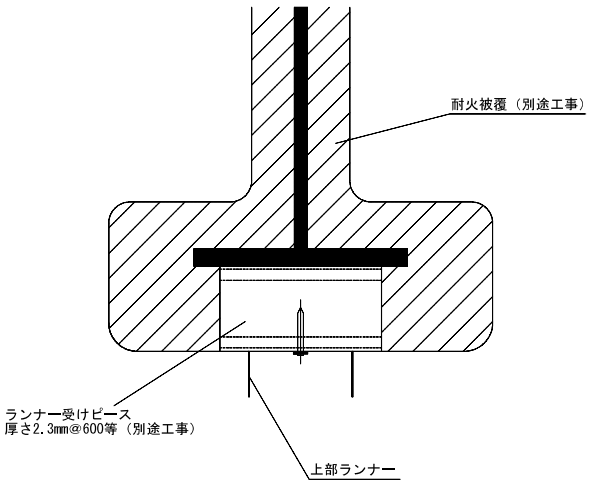
（１）墨打ち面に砂その他の汚れや凹凸がある場合は、事前によく清掃してから墨出しをする。
（２）躯体の芯墨、または返り墨から所定の間仕切壁の芯墨を出し、取り付けランナーの面墨を上、下スラブ面に出す。
（３）間仕切の長さが長いところでは、直線度に特に注意する。
（４）墨出し終了後、墨出し位置をチェックした後、建設元請業者の監督員の承認を受ける。

５－２－２　ランナーの取り付け

（１）上部および下部ランナーは、正確に墨出しされたスラブ面などに固定用ピンなどで固定する。
（２）固定用ピンは、ランナーの端部より約５０㎜の位置に打ち、中間部は９００㎜以内の間隔で固定する。
（３）耐火被覆される鉄骨梁に上部ランナーを取り付ける場合は、耐火被覆工事に先立ってランナー受けピース材を溶接などにより固定し、上部ランナーを取り付け、鉄骨の耐火被覆を施工する。



＜天井スラブおよびＲＣへの上部ランナーの取り付け＞



＜鉄骨梁への上部ランナーの取り付け＞

（４）上部および下部ランナーは、壁または柱などへは突き付けずに約１０㎜離す。

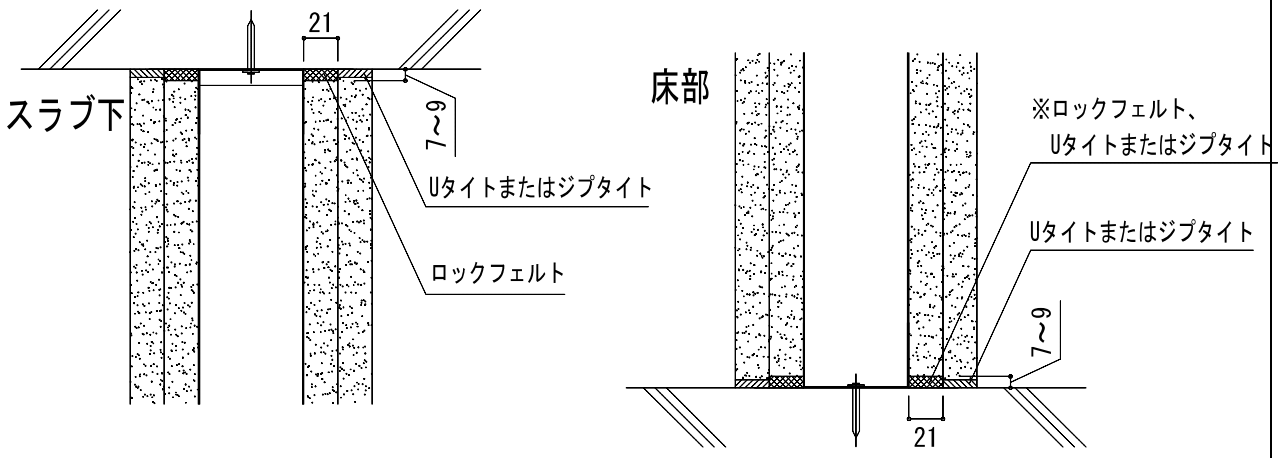
５－２－３　スタッドの建て込み

（１）スタッドは、上部および下部ランナーの内法高さ寸法より少し短く切断(約１０㎜)する。スタッドの形状は、壁高に応じて選定する。
（２）スタッドは、６０６㎜以内の間隔で取り付ける（標準は、４５５㎜)。
（３）振れ止めは、必要に応じて約１，２００㎜の間隔で取り付ける。
（４）スタッドスペーサーは、必要に応じて約６００㎜の間隔で取り付ける。

５－２－４　耐火目地材の充てん

（1）ＴＢＺを下張りする前に、スラブ下、梁下、壁、床などの取合部に「タイガーロックフェルト」（厚さ１０㎜×幅２１㎜×長さ１０００㎜）を張り付ける。

（2）「タイガーロックフェルト」は、躯体面に取り付け、つなぎ目の部分にすき間が生じないように十分注意する。



※床部の下張りに「タイガーUタイト」を使用した場合は、上張りに、必ず「タイガージプタイト」を使用する。

５－２－５　下張りＴＢＺの張り付け

（1）ＴＢＺは横張りまたは縦張りとする。

（2）ＴＢＺは、スラブ下、梁下、壁、床などに張り付けてある「タイガーロックフェルト」を軽く押しつぶすようにしながらスタッドにタッピンねじで留め付ける。留め付けの際、「タイガーロックフェルト」の間にすき間が生じないように十分注意する。
床部に「タイガーロックフェルト」を使用しなかった場合は、ＴＢＺと床スラブの間に５㎜程度の目透かしを設けて留め付ける。目透かし部に「タイガージプタイト」または「タイガーUタイト」等をすき間が残らないように充てんする。ただし、上張り張り付け時の＜５－２－７取合部の処理＞において「タイガージプタイト」を使用しない場合は必ず床スラブと下張り目透かし部には「タイガージプタイト」を使用する。

（3）ＴＢＺは、スタッドと接した部分に不陸が生じないように調整しながら、タッピンねじで３００㎜以内の間隔で留め付ける。ねじ頭は、ＴＢＺ表面より軽く凹ませる。

（4）ＴＢＺ同士の目地部は、すき間のないように互いに突き付け張りとする。

５－２－６　上張りＴＢＺの張り付け

（1）ＴＢＺは、原則として縦張りとし、下張りのＴＢＺと目地が重ならないように割り付ける。

（2）ＴＢＺは、コンクリート壁などとの取合部は、５㎜以内の目透かしとなるように調整する。

（3）ＴＢＺの留め付けは、無機質系接着材「タイガートラボンド」または酢酸ビニル樹脂系接着材「吉野サクビボンド」などを２００g/㎡以上点付けし、ステープルで留め付ける。ステープルの間隔は、２００㎜以内で１箇所あたり１本以上とする。

（4）階段室やエレベーターシャフト内側にＴＢＺを張る場合は、風圧や地震を考慮し、必要に応じてφ３．５㎜以上×５０㎜以上のタッピンねじでスタッドに９００㎜以内の間隔で留め付ける。

（5）ＴＢＺ同士の目地部は、すき間のないように互いに突き付け張りとする。

５－２－７　取合部の処理

（１）上張りＴＢＺの張り付け終了後、スラブ下、梁下、壁、床などの取合部は、「タイガージプタイト」または「タイガーUタイト」などですき間のないように充てんする。ただし、床部の下張り取合部に「タイガーUタイト」を使用した場合には、必ず「タイガージプタイト」を使用する。

（２）吹き付け耐火被覆との取合部は、「タイガージプシール」などですき間のないように充てんする。

５－２－８　グラスウールなどの挿入（挿入する場合に限る）

（１）片面の取合部の処理後、中空部にグラスウールなどを挿入し、下張りＴＢＺにステープルまたはスピンドルピンでズレ落ちないように留め付ける。

（２）グラスウールなどは、スタッドのスペーサー部に接する部分に切り込みをいれ、スタッド内および上下ランナー内に差し込むようにしてすき間の出ないように充てんする。

５－２－９　継目部等の処理（必要に応じて処理する場合に限る）

上張りＴＢＺの継目部等は、ジョイントテープ「タイガージョイントテープ」、「タイガーGファイバーテープ」とジョイントコンパウンド(パテ)「タイガーUライト」、「タイガーＦライト」、「タイガーＳＰライト」、「タイガーライト」、「タイガーＶシールパテ」、「タイガーＧＬパテ」、「タイガーＵＰパテ」、「タイガーＦトップパテ」、「タイガーＳＰパテ」、「タイガーパテ」、「タイガージョイントセメント」などを用いて仕上げる。

５－２－１０　仕上げ（必要に応じて処理する場合に限る）

ペイント、壁装材貼り、吹付けなどで仕上げる。

５－２－１１　その他設計、施工上の留意点

（１）この施工指導書は、認定書の中から当社が推奨する材料を明記してあります。

（２）外壁や最上階スラブ下など発泡系断熱材を施工する場合は断熱工事に先立って当壁構造を施工する。

（３）ＲＣ梁下に当壁構造を設ける場合は、上部ランナー留め付けピンの保持力が低下しないように、壁の芯が梁際から８０㎜程度以上内側となるように配置するか、上部ランナー固定用アンカーピースなどを埋込みとする。

（４）ランナー受けピースなどを鉄骨梁に溶接する場合は、鉄骨母材を傷めないように配慮してください。

（５）フラット型デッキプレート下に当壁構造が直交、平行にくる場合、壁芯の左右２５０㎜程度に当たるデッキの山はカットし、壁がスラブまで当たるようにする（納まり図参照）。

（６）デッキプレートに上部ランナーを取り付けた場合のデッキプレート凹部の中空層と上部ランナーとの納まりについては、以下の方法で処理をする。

① デッキプレート凹部の中空層にロックウール１５０kg/m^{3}をすき間なく充てんする。次にロックウール部分に「タイガージプシール」をへらなどで押しつけながらすき間なく塗り付ける。「タイガージプシール」の塗り厚は、上張り＋下張りの厚さ以上とする。

② デッキプレート凹部の中空層にロックウール１５０kg/m^{3}をすき間なく充てんする。その両側には１２．５㎜厚せっこうボード１枚をデッキプレート下の上張り面材に接着材とステープルなどで留め付ける。

（７）当壁構造は非耐力間仕切壁構造のため、その四周処理法は躯体の変形等による外力が間仕切壁に伝わらないことを前提として取合部の処理、目透かし寸法などを決めております。柱、梁、などの躯体の変形（床スラブのクリープ含む）は一様ではなく、地震の大きさや建物の構造、またはその他の要因により大きく異なりますので、変形が予想される場合には別途、納まりをご検討ください。

（８）当壁構造に電気ボックス類は、取り付けない。

（9）当壁構造にドアを取り付ける場合は、開口部補強材を独立して、床、スラブ下、梁などの躯体に直接固定用ピンまたは溶接などにより固定する。

（１０）高層建築物が強風等により揺れて、当壁構造にきしみ音低減対策が必要な場合は、別途ご検討ください。

⑥ 検 査

６－１ 自主検査

工 程	項 目	要 点	方 法	基 準	管理方式
墨 出 し	基準墨	寸 法	コンベックス	±２．０㎜	チェック検査
ランナー取り付け	固定用ピン	間 隔	コンベックス	９００㎜以内	
スタッド建て込み	スタッドの垂直度	寸 法	下げ振り水準器	±２．０㎜	
	割り付け	間 隔	コンベックス	６０６㎜以内	
ＴＢＺ 張り付け（下張り）	突き付け	目違い	スケール等	２．０㎜以内	
	目 地	すき間	目 視	すき間がないこと	
	タッピンねじ	間 隔	スケール等	３００㎜以内	
ＴＢＺ 張り付け（上張り）	突き付け	目違い	スケール等	１．５㎜以内	
	目 地	すき間	目 視	すき間がないこと	
	接着材	重 量	秤または容器	２００g/㎡以上	
	ステープル	間 隔	スケール等	２００㎜以内	
グラスウールなど	挿 入	すき間	目 視	すき間がないこと	
壁 端 部	充てん	すき間	ライト	透過光のないこと	

６－２ 立合検査

立合検査は、建設元請業者の監督員の指示に基づいて行う。

認　定　書

国住指第　4465　号
平成 21 年 3 月 13 日

吉野石膏株式会社
代表取締役社長　須藤 永一郎　様

国土交通大臣　　金子　一義

下記の構造方法等については、建築基準法第 68 条の 26 第 1 項（同法第 88 条第 1 項において準用する場合を含む。）の規定に基づき、同法第 2 条第七号及び同法施行令第 107 条第二号（間仕切壁（非耐力壁）：1 時間）の規定に適合するものであることを認める。

記

1. 認定番号
　FP060NP-0197

2. 認定をした構造方法等の名称
　両面せっこうボード・強化せっこうボード張／軽量鉄骨下地間仕切壁

3. 認定をした構造方法等の内容
　別添の通り

（注意）この認定書は、大切に保存しておいてください。

認　定　書

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記

1. 認定番号
　FP060NP-0198

2. 認定をした構造方法等の名称
　人造鉱物繊維断熱材充てん／両面せっこうボード・強化せっこうボード張／軽量鉄骨下地間仕切壁

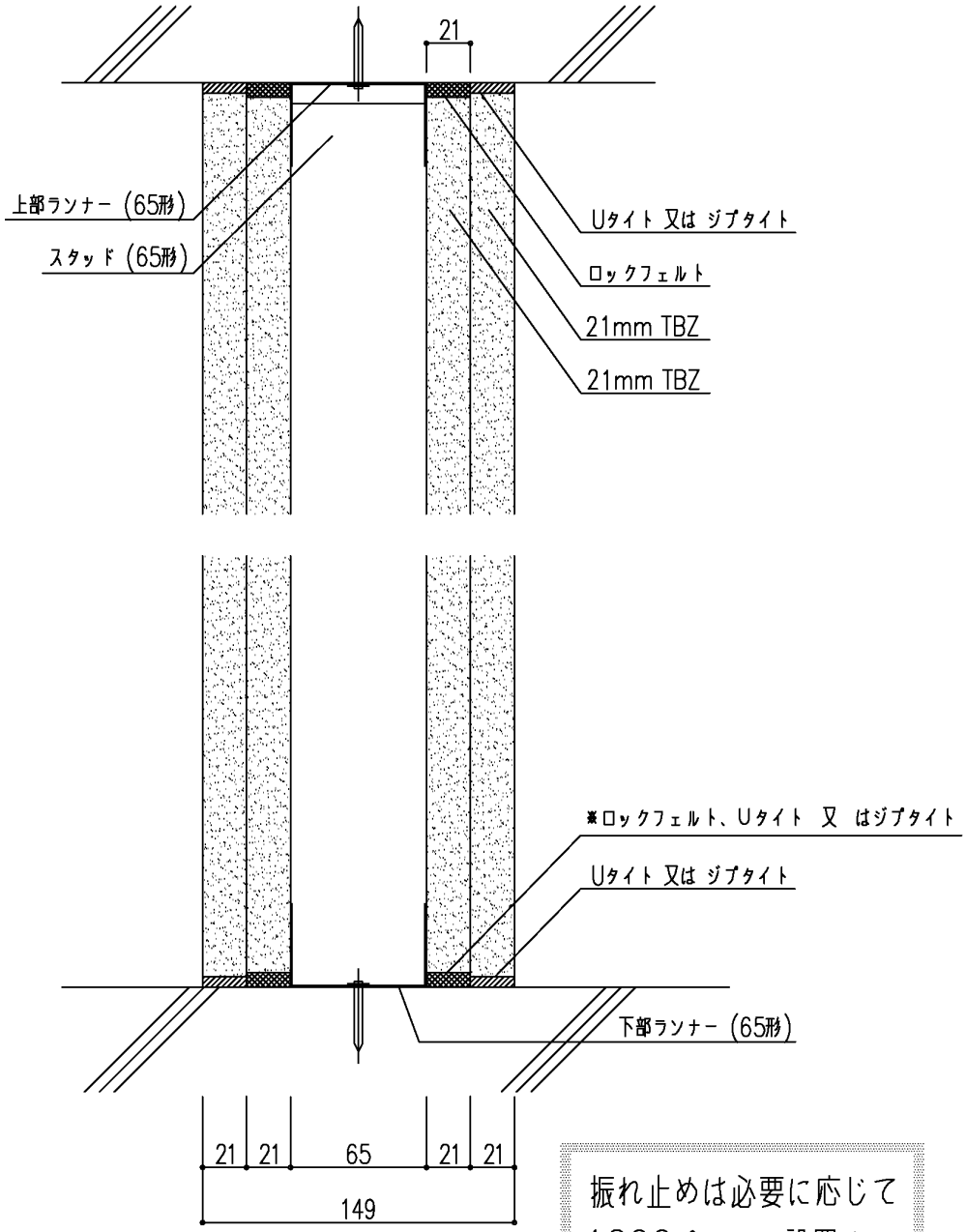
3. 認定をした構造方法等の内容
　別添の通り

（注意）この認定書は、大切に保存しておいてください。

吉野耐火システム　Ａ２１
標準施工指導書

Ｔ－００１－ １５

標準垂直断面図



※床部の下張りにUタイトを使用した場合は、上張りに必ずジプタイトを使用する。

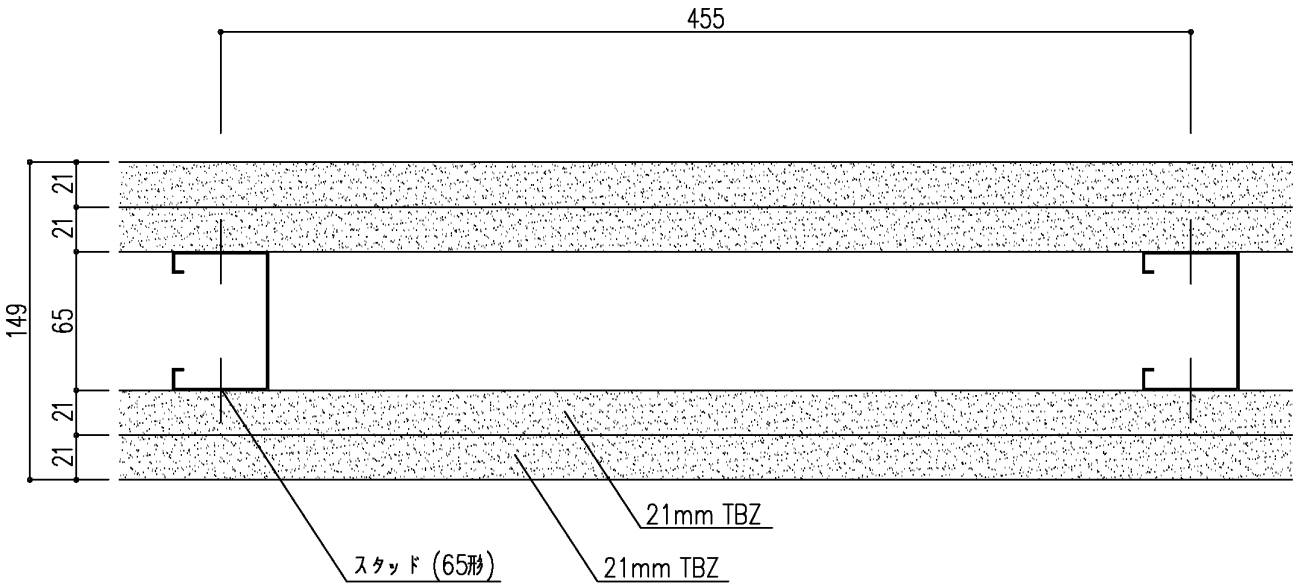
図面名　コンクリートスラブ、床との納まり

［平成２４年９月版］

吉野耐火システム　Ａ２１
標準施工指導書

Ｔ－００１－　１６

標準水平断面図



※耐火認定上のスタッド間隔は606mm以内
標準のスタッド間隔は455mmとする。

図面名　水平断面図

［平成２４年９月版］

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Yoshino Fire Resistant System

B15

1 Hour Fire Resistant Structure Accredited by Minister of Land, Infrastructure, Transport and Tourism

FP060NP-0174

FP060NP-0175

Installation Instructions

[April 2014 version]

Yoshino Gypsum Co., Ltd.

Note: This is unofficial trial translation by JED to understand the contents. So, please follow the official Japanese version issued by Yoshino Co., Ltd.

To construct safely and correctly

When a dry type fire resistant sound insulating wall is constructed as party wall of multiple dwelling house (condominium, etc.), it is obligated to comply with Ordinance of Ministry of International Affairs and Communications No. 40 based on “Special Standard [Fire Services Act Enforcement Ordinance, Article 29-4]”, and that detailed provisions of Fire Station Prevention Section Notice No. 188 and 500. That Notice No. 500 specifies “it is limited to when construction control system is arranged” as construction condition.

“Being limited to when construction control system is arranged” means that the following requirements are fulfilled:

1) Construction method of dry type wall is specified by construction specification, etc. made by the maker.
2) Those who are assigned as supervisors, etc. on construction sites have completed technical training provided by the maker.
3) Construction status is checked with self-inspection and the result is stored.

“Standard Construction Instruction” corresponds to the above 1.

Regarding the above 2, in order to thoroughly implement “construction control of Fire Resistant, Sound Insulation System”, Yoshino Gypsum Board has an established system that <Tiger Fire Resistant Sound Insulation Structure Construction Study Group> or other equivalent organizations provide technical training like practical skill training which assumes on-site construction and award a certificate of completion <license> to those who completed the training.

The above mentioned is intended to arrange the construction control system to ensure Fire Resistance Performance of dry type party wall at construction sites. Since this concept is required for construction of Fire Wall except party wall, it shall be ensured to implement construction by following contents of this “Standard Construction Instruction”.

Others:

1. Make sure to read this “Standard Construction Instruction” carefully before construction and understand it well.
2. Keep the “Standard Construction Instruction” in place to check it at any time throughout the construction.

Contents

1. General Rules

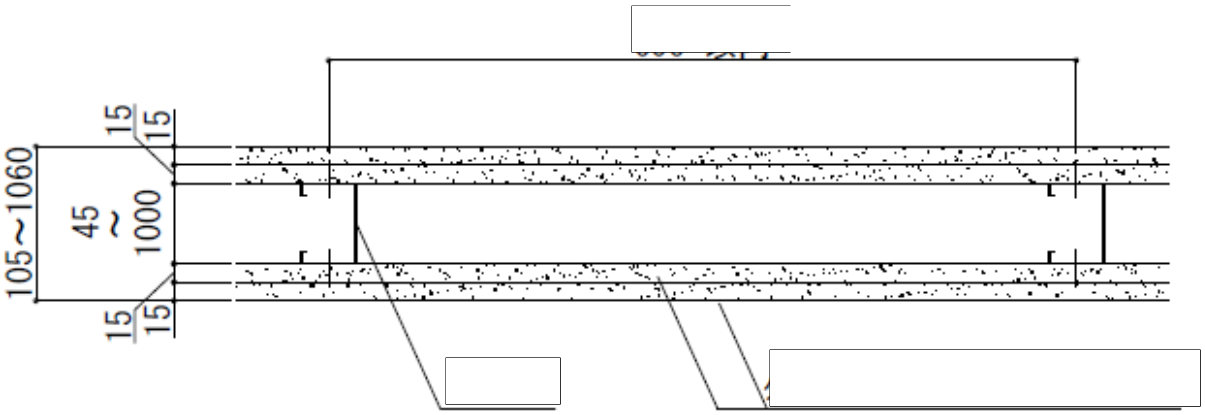
1.1 Scope

This Standard Construction Instruction applies to Yoshino Fire Resistant System B15.

Yoshino Fire Resistant System B15

1 Hour Fire Resistant Structure　Accredited by Minister of Land, Infrastructure, Transport and Tourism
FP060NP-0174 (Where sound insulating materials are not inserted in hollow parts)
FP060NP-0175 (Where sound insulating materials are inserted in hollow parts)

Horizontal section (specification of accreditation where sound insulating materials are not inserted in hollow parts)



*Standard stud interval shall be 455 mm.
*A shape (45, 50, 65, 75, 90 or 100 type, etc.) of chosen stud according to a wall height differs.
*The drawings in this document indicates nominal dimension value of each component.

1.2 Full dissemination

When constructing Yoshino Fire Resistant System B15, make sure that all workers are informed and understand this Standard Construction Instruction through a seminar or other ways.

1.3 Construction

Contractors must ensure to construct accurately according to this instruction. When unwritten things in the instruction or questions arise, the contractors need to discuss with Yoshino Gypsum Co., Ltd. and consider construction methods.

1.4 Report

When construction is completed, contractors need to report to a supervisor of the prime contractor for construction and have inspection.

2. Safety measure

Safety comes first at works on sites and each one shall be aware of it and act accordingly. If there are dangerous procedures or safety control can not be secured, workers need to even stop working, get united, and give a top priority to safety control. Completing the construction without injuries until the end shall be a principle.

<Notice to Tiger Board type>

* Yoshino Gypsum Co., Ltd. does not guarantee the performance if it is used for purposes except the specified application.

* When cutting the board for construction, pay attention to collecting dust, etc. and use dust prevention cutter or dust collecting circular saw. Also, for dusts generated at works like sanding, it is recommended to wear dust prevention mask or safety glass.

*If many layers are piled up for storing, it may fall down.

*Regarding disposal of waste materials of Tiger Board type and cleaning drainage, be careful not to cause environmental pollutions.

3. Packaging, transportation, lifting and storage of boards

3.1 Packaging

For storage packaging, a stack usually consists of 80 sheets of reinforced gypsum boards (15 mm).

3.2 Transportation

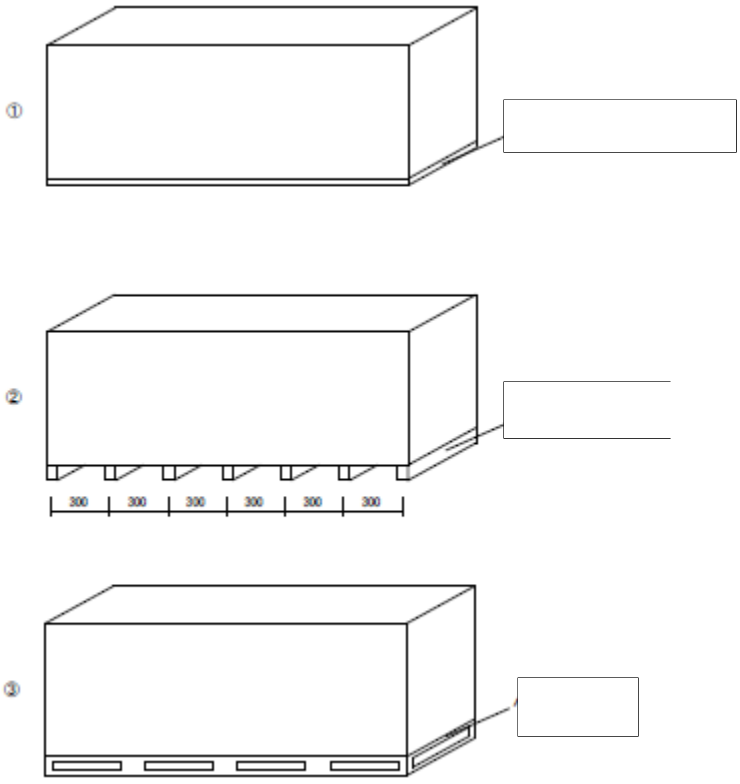
Transportation of reinforced gypsum boards, etc. shall be discussed with a supervisor of the prime contractor for construction and be implemented based on on-site transportation plan.

3.3 Lifting

Lifting to each floor shall be done with a lift provided on site and follow on-site lifting criteria.

3.4 Storage

1) Place the boards evenly not to fall down or get chipped.
2) Put at least 1 m of a distance from walls.
3) Do not put on any slope or marked areas.
4) Do not put on uneven surface or wet place. If water may ~~get~~ leak~~ed~~ from upper floors, cure with sheet, etc. in advance.
5) Store reinforced gypsum boards, etc. on stands with uniform height, and edges of the boards shall not be outside the stand like the following drawings to prevent boards from waving or getting wrapped. Also, top board of each pile shall be placed facing down.



(*In case of long boards, (1) or (3) shall be implemented)

6) When 2 stacks are piled up, blocks of first and second layer stack shall be aligned.

7) Do not use reinforced gypsum boards, etc. as stepping-stool.

3.5 Disposal of remaining materials, cleaning

Remaining reinforced gypsum boards and other remaining materials shall be collected at designated places on each floor and the places shall be cleaned every day.

4. Materials

4.1 Major component

4.1.1 Reinforced gypsum board (GB-F)

Product name: Tiger Board Type Z (hereinafter referred to as TBZ)

1) Specification　Non-combustible NM-8615, JIS A 6901
2) Dimension
   Thickness　15 mm
   Size (standard)　910 mm x 1,820, 2,420, 2,730 mm
3) Performance
   Specific gravity　0.75 or more
   Moisture content　3 % or less

4.1.2 Top and bottom runner

JIS G 3302 or JIS G 3313, etc.

⊏ 45 to 1,000 x 30 to 75 x 0.4 mm or more

4.1.3 Stud

JIS G 3302 or JIS G 3313, etc.

⊏ 45 to 1,000 x 45 to 75 x 0.4 mm or more

□ - 45 to 1,000 x 40 to 50 x 0.4 mm or more

Selection sample of wall heights and studs (when using JIS A 6517 studs and bracing)

Wall height up to 2.7 m : ⊏ 50 x 45 x 0.8 mm

Wall height up to 4.0 m : ⊏ 65 x 45 x 0.8 mm or ⊏ 75 x 45 x 0.8 mm

Wall height up to 4.5 m : ⊏ 90 x 45 x 0.8 mm

Wall height up to 5.0 m : ⊏ 100 x 45 x 0.8 mm

4.1.4 Bracing (use the followings when providing as necessary)

JIS G 3302 or JIS G 3313, etc.

⊏ 19 to 25 x 10 x 0.9 mm or more

4.1.5 Glass wool, etc. (use the followings when inserting as necessary)

Glass wool: JIS A 6301, JIS A 9504 or JIS A 9521

Density 10 kg/m^3 or more, Thickness 12 mm or more

Rock wool: JIS A 6301, JIS A 9504 or JIS A 9521

Density 10 kg/m^3 or more, Thickness 25 mm or more

4.2 Sub-constituent material

4.2.1 Fixing pin for runner

Concrete nail: Ø 2.0 mm or more x 10 mm or more

Buffer pin: Ø 2.0 mm or more x 10 mm or more

And other anchor piece for fixing, etc.

4.2.2 Stud spacer

Board of 0.5 mm or more thick specified by JIS G 3302 or 3313, etc.

4.2.3 Tapping screw, staple, etc.

1) Tapping screw that is treated rust prevention

Ø 3.5 mm or more x 25 mm or more

2) Staple that is treated rust prevention

Staple for fixing top layer TBZ　4 mm or more (W) x 25 mm or more (L)

Staple for fixing glass wool, etc.　4 mm or more (W) x 16 mm or more (L), etc.

(Spindle pin (25 mm or more in length) is also acceptable for fixing glass wool, etc.)

4.2.4 Adhesive

Inorganic adhesive “Tiger Tora Board” (made by Yoshino Gypsum Board Co., Ltd.) or vinyl acetate resin adhesive “Yoshino Sakubi Bonding”, etc.

4.2.5 Materials for joint finishes, etc. (use the followings when providing joint finishes as necessary)

1) Joint compound (putty)
   “Tiger U Light”, “Tiger F Light”, “Tiger SP Light”, “Tiger Light”, “Tiger V Seal Putty”, “Tiger GL Putty”, “Tiger UP Putty”, “Tiger F Top Putty”, “Tiger SP Putty”, “Tiger Putty”, “Tiger Joint Cement” (made by Yoshino Gypsum Board Co., Ltd.), etc.
2) Joint tape
   “Tiger Joint Tape”, “Tiger G Fiber Tape”, etc.

4.2.6 Filling material

1) Fire resistant joint filler
   Rock wool “Tiger Rock Felt” (10 mm thick x 15 mm wide x 1,000mm long), etc.
2) Inorganic Filling material
   “Tiger Gyptight”, “Tiger Gypseal” (made by Yoshino Gypsum Co., Ltd.), etc.
3) Sealant
   Urethane system “Tiger U Tight”, modified silicone-based “Tiger Fire Resistant Sealant”, etc.

5. Working instruction

5.1 Standard construction procedure

Mark a location of wall

↓

Provide runners

↓

Position studs

↓

Provide bracing (only when providing as necessary)

↓

Side A, fill up runner joints interface with fire resistant joint filler “Tiger Rock Felt”

↓

Side A, provide underlayer boards

↓

Side A, provide top layer boards

↓

Side A, fill up joints interfaces of top layer boards (“Tiger Gpytight” or “Tiger U Tight”)

↓

Provide glass wool, etc. from B side (only when inserting as necessary)

↓

Side B, fill up runner joints interface with fire resistant joint filer “Tiger Rock Felt”

↓

Side B, provide underlayer boards

↓

Side B, provide top layer boards

↓

Side B, fill up top layer board joint interface (Tiger Gyptight” or “Tiger U Tight”)

↓

Inspection

↓

Joint and other finishes (These finishes are not essential for getting authorization for fire resistance.)

↓

Finish (This is not essential for getting authorization of fire resistance.)

↓

Inspection

↓

Delivery

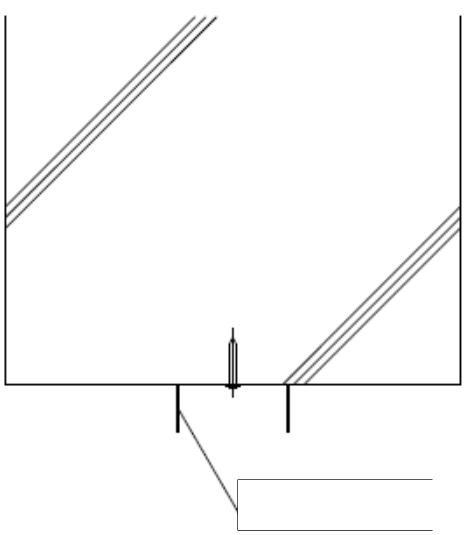
5.2 Working instruction

5.2.1 Mark

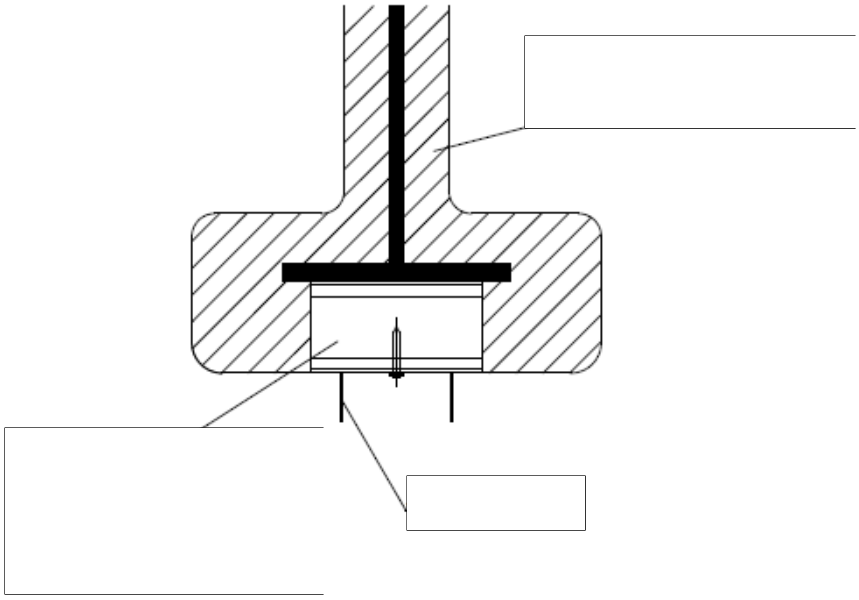
1) If a marking surface has sand, other dirt or unevenness, clean well in advance then mark.
2) Mark a center line of given partition wall from a center line or offset line of frame of the building and mark an end line of provided runner on top and bottom slab surfaces.
3) At a part where a partition is long, be careful for especially straightness.
4) After completing marking and checking locations of the marks, get approval from a supervisor of the prime contractor for construction.

5.2.2 Provide runners

1) Fix top and bottom runners to accurately marked slab surface, etc. with fixing pins, etc.
2) Insert a fixing pin at around 50mm from the end parts of runners and fix middle parts at intervals not exceeding 900 mm.
3) When providing top runner to steel beam having fire resistant coating, prior to fire resistant coating construction, fix a runner-receiving piece material by welding, etc., provide top runner and provide fire resistant coating to steel.



<Providing of runner to ceiling slab and RC>



<Providing of runner to steel beam>

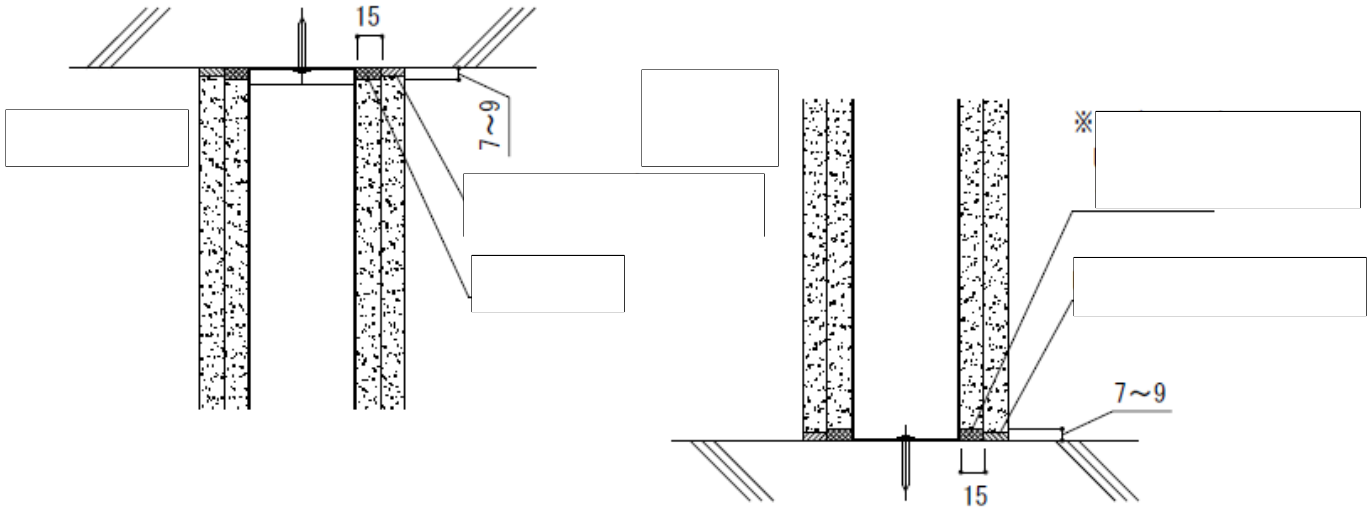
4) Top and bottom runners shall not be contacted but put around 10 mm of distance from wall or pillar, etc.

5.2.3 Position studs

1) Cut a stud a little (around 10 mm) shorter than internal height of top and bottom runner. Choose a shape of stud according to wall height.
2) Provide a stud at intervals not exceeding 606 mm (the standard is 455 mm).
3) Provide bracing at intervals of around 1,200 mm as necessary.
4) Provide stud spacer at intervals not exceeding 600 mm.

5.2.4 Fill up with fire resistant joint filler

1) Provide “Tiger Rock Felt” (10 mm thick x 15 mm wide x 1,000 mm long) to joints interface like under slab, under beam, wall, and floor before underlaying TBZ.
2) Provide “Tiger Rock Felt” to frame surface of the building and make sure that no gap between joints is created.



*When “Tiger U Tight” is used for underlaying for floor part, make sure to use “Tiger Gyptight” for overlaying.

5.2.5 Provide underlayer TBZ

1) Provide TBZ horizontally or vertically in a manner to minimize loss.
2) Fix TBZ on stud with tapping screws while lightly pushing “Tiger Rock Felt” laid under slab, beam, or on wall, or floor. When fixing, be careful not to create a gap with “Tiger Rock Felt”. When “Tiger Rock Felt” was not used for floor parts, create a gap of approximately 5mm between TBZ and floor slab, then fix it. Fill up the gapped part with “Tiger Gyptight” or “Tiger U Tight”, etc. until the gap is eliminated. However, when not using “Tiger Gyptight” at <5.2.7 Process joints interface> at a time of providing a top layer, make sure to use “Tiger Gyptight” in the gapped part for underlaying.
3) While adjusting TBZ not to make roughness at parts contacted to studs, fix it with tapping screws at intervals not exceeding 200 mm. Indent a screw head a little deeper than TBZ surface. If a tapping screw is located too close to the end parts of TBZ, TBZ may get chipped and the edge may get damaged so be careful.
4) TBZs shall be butted each other not to make a gap at joint parts.

5.2.6 Provide top layer TBZ

1) TBZ shall be provided vertically in principle and lay out not to overlap underlayer TBZ with joints.
2) Adjust TBZ at joint parts with concrete wall, etc. so that gapped parts become 5 mm or less.
3) Temporarily fix TBZ by spotting 150 g/m^2 or more of inorganic adhesive “Tiger Tora Bonding” or vinyl acetate resin adhesive “Yoshino Sakubi Bonding”, etc. then fix TBZ with staples. An interval of staples shall be within 200 mm and 1 staple or more shall be used at 1 place.
4) When providing TBZ inside a staircase or elevator shaft, consider wind pressure and earthquake and fix it on stud with tapping screws of minimal Ø3.5 mm x minimal 40 mm at intervals not exceeding 600 mm as necessary.

5) TBZs shall be butted each other at joint parts not to create a gap.

5.2.7 Finish joints interface

1) After completing providing top layer TBZ, fill up joints interface of wall, floor, under slab, or under beam with “Tiger Gyptight” or “Tiger U Tight”, etc. not to have a gap. However, when “Tiger U Tight” was used at underlayer joints interfaces of floor part, make sure to use “Tiger Gyptight”.
2) Fill up joints interfaces of spray fire resistant coating with “Tiger Gypseal”, etc. not to have a gap.

5.2.8 Insert glass wool, etc. (only when inserting)

1) After processing joints interfaces of one side, insert glass wool, etc. in hollow parts and fix it to underlayer TBZ with staples or spindle pins not to fall down.
2) Make a notch in parts connecting to spacer parts of studs, and insert glass wool, etc. inside stud and upper and bottom runners not to create a gap.

5.2.9 Finish joint parts (only when finishing as necessary)

Joint parts, etc. of top layer TBZ shall be finished with joint tape “Tiger Joint Tape”, “Tiger G Fiber Tape” and joint compound (putty) “Tiger U Light”, “Tiger F Light”, “Tiger SP Light”, “Tiger Light”, “Tiger V Seal Putty”, “Tiger GL Putty”, “Tiger UP Putty”, “Tiger F Top Putty”, “Tiger SP Putty”, “Tiger Putty”, “Tiger Joint Cement”, etc.

5.2.10 Finish (only when finishing as necessary)

Finish by painting, pasting wall materials, spraying, etc.

5.2.11 Notes of other design, construction

1) This Standard Construction Instruction specifies materials that Yoshino recommends among the Accreditation.
2) When providing foamed heat insulator to an external wall or under slab of top floor, provide this wall structure before heat insulating construction.
3) When providing this wall structure under RC beam, place a wall center at least around 80 mm inside from the beam edge, or embed anchor pieces for fixing top runner, etc. so as to prevent top runner fixing pins from losing retaining capability.
4) When welding parts such as runner-receiving pieces to steel beams, take care not to damage steel base materials.
5) When this wall structure crosses at right angles or runs in parallel under flat type deck plate, cut the lumps of deck at the left and right approximately 250 mm from the wall center so that the wall contacts the slab (refer to detailing drawing).
6) Regarding connection between hollow part of deck plate dent part and the top runner when providing top runner at deck plate, treat in the following method:
    I. Fill up hollow layer of deck plate dent with 150 kg/m^3 of rock wool until no gap. Next, paste “Tiger Gypseal” at rock wool part by pressing it down with a spatula not to make a gap. Coating “Tiger Gypseal” shall be thicker than top layer + under layer.
    II. Fill up the hollow layer of deck plate dent with 150 kg/m^3 of rock wool until no gap. At the both sides, fix one gypsum board (12.5 mm thick) on top layer surface material under deck plate with adhesive and staples, etc.

7) Since this wall structure is non-bearing partition wall structure, the method for processing the four side premises that external forces due to deformation of the building frame do not transmit partition walls and decides joints interface finishes, gapped part dimensions, etc. Deformation of the building frame like a pillar, beam and the like (including creep of floor slab) is not uniform and greatly differs depending on size of earthquakes, building structure or other factors. So, when deformations are predicted, it is necessary to take additional consideration of connection.
8) Do not provide electricity box or similar nature of any equipment to this wall structure.
9) When providing doors to this wall structure, fix openings reinforcement materials independently and directly on the building frame like floor, under slab, beam, etc. with fixing pins or by welding, etc.
10) Separate consideration should be given if a high-rise building swings due to strong winds, etc. and this wall structure needs squeak noise reduction measure.
11) The galvanized steel sheet shall be 0.11 – 2.3 mm thick when being provided between stud and underlayer material or between underlayer material and top layer material.

6. Inspection

6.1 Self inspection

Process	Item	Point	Method	Criteria	Control method
Marking	Criteria mark	Dimension	Convex	±2.0 mm	Check Inspection
Providing of runner	Fixing pin	Interval	Convex	Within 900 mm	
Providing of stud	Perpendicularity of stud	Dimension	Plumb level	±2.0 mm	
	Layout	Interval	Convex	Within 606 mm	
Providing (underlayer) of TBZ	Butting	Dislocation between both plates	Ruler	Within 2.0 mm	
	Joint	Gap	Visual check	No gap	
	Tapping screw	Interval	Scale	Within 200 mm	
Providing (top layer) of TBZ	Butting	Dislocation between both plates	Ruler	Within 1.5 mm	
	Joint	Gap	Visual check	No gap	
	Adhesive	Weight	Balance or container	150 g/m^2 or more	
	Staple	Interval	Scale	Within 200 mm	
Glass wool, etc.	Inserting	Gap	Visual check	No gap	
Wall end part	Filling	Gap	Light	No transmitted light	

6.2 Witness inspection

Implement witness inspection based on instruction of a supervisor of the prime contractor for construction.

Certificate

MLIT Notification No.3567

December 25, 2008

Dear President Mr. Eiichiro Sudo of Yoshino Gypsum Co., LTD.,

The following construction method, etc. have been recognized to comply with the provisions of the Building Standard Law, Article 2, Item 7 and the enforcement order of the same Law, Article 107, Item 2 (Partition Wall (non-bearing wall): 1 Hour Rating) based on the provision of the same Law, Article 68-26, Paragraph 1 (including cases where it is applied mutatis mutandis pursuant to Article 88, Paragraph 1 of the same Law).

Note

1. Certificate number
   FP060NP-0174

2. Name of Accredited Construction Method, etc.
   Double Sided Reinforced Gypsum Board Laminated / Light Weight Steel Substrate Partition Wall

3. Contents of Accredited Construction Method etc.
   As per attachment

(Notice) Please keep this Certificate safe.

Kazuyoshi Kaneko

Minister of Land, Infrastructure, Transport and Tourism

Certificate <Fire Resistance Structure> (Where sound absorbing materials are not inserted in hollow parts)

Certificate

MLIT Notification No.3568

December 25, 2008

Dear President Mr. Eiichiro Sudo of Yoshino Gypsum Co., LTD.,

The following construction method, etc. have been recognized to comply with the provisions of the Building Standard Law, Article 2, Item 7 and the enforcement order of the same Law, Article 107, Item 2 (Partition Wall (non-bearing wall): 1 Hour Rating) based on the provision of the same Law, Article 68-26, Paragraph 1 (including cases where it is applied mutatis mutandis pursuant to Article 88, Paragraph 1 of the same Law).

Note

1. Certificate number
   FP060NP-0175

2. Name of Accredited Construction Method, etc.
   Man-made Mineral Fiber Heat Insulator Filled / Double Sided Reinforced Gypsum Board Laminated / Light Weight Steel Substrate Partition Wall

3. Contents of Accredited Construction Method, etc.
   As per attachment

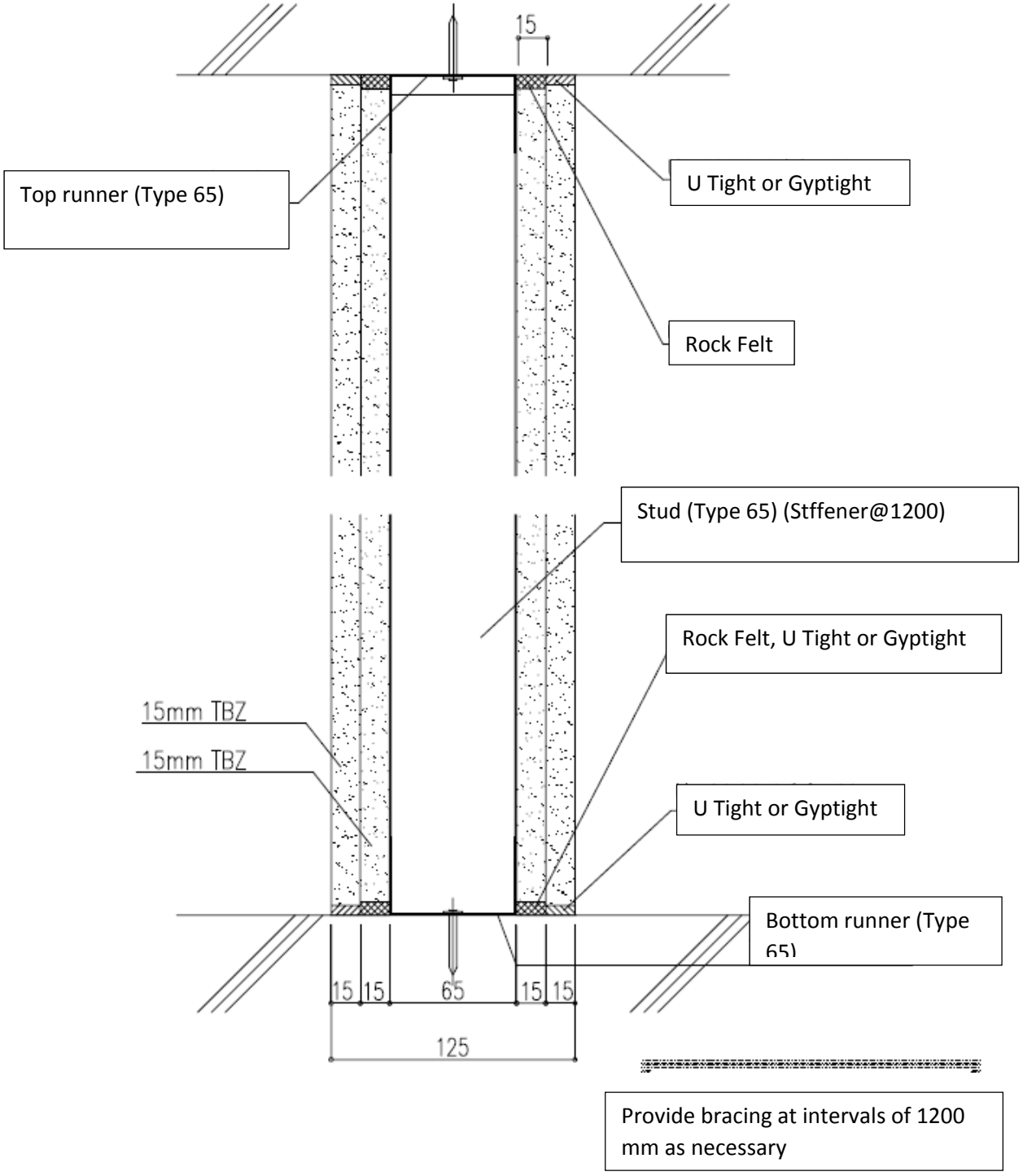
   (Notice) Please keep this Certificate safe.

Kazuyoshi Kaneko

Minister of Land, Infrastructure, Transport and Tourism

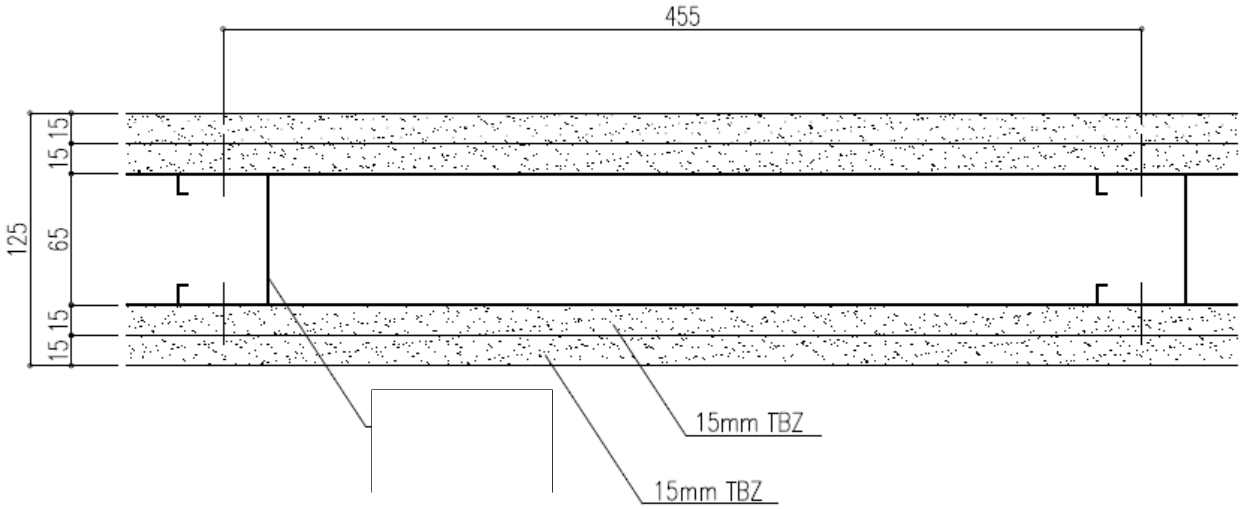
Certificate <Fire Resistance Structure> (Where sound absorbing materials are inserted in hollow parts)

Standard vertical section



*When U Tight is used for underlaying for floor parts, make sure to use Gyptight for overlaying.

Standard horizontal section



* For accreditation of fire resistance, stud interval shall be within 606 mm.

Standard stud interval shall be 455 mm.

吉野耐火システム

B15

１時間耐火構造　国土交通大臣認定　ＦＰ０６０ＮＰ－０１７４
ＦＰ０６０ＮＰ－０１７５

標準施工指導書

[平成２６年４月版]

安全で快適な住空間を創る
YOSHINO
吉野石膏株式会社

吉野耐火システム B15
標準施工指導書

T－002－1

安全で確実に施工をしていただくために

乾式耐火遮音壁を、集合住宅（マンション等）の戸境壁等として施工する場合は“特例基準「消防法施行令２９条の４」”に基づいた総務省令第４０号、その細目を定めた消防予第１８８号および第５００号通知内容を遵守する義務があります。その第５００号通知には施工条件として、「施工管理体制が整備されている場合に限る」と明記されております。

「施工管理体制が整備されている場合に限る」とは、

① 乾式壁の施工方法―メーカーが作成した施工仕様書等により明確とされていること。

② 施工現場における指導・監督等―メーカーが実施する技術研修を修了した者が選任されていること。

③ 施工状況の確認等―自主検査による確認が行われ、かつその結果が保存されていること。

の要件が整っていることです。

「標準施工指導書」が①にあたるものとなります。

②につきましては、「耐火・遮音システムの施工管理」を徹底するため、《タイガー耐火遮音構造施工研究会》またはそれに準ずる組織で、現場施工を想定した実技研修などの技術研修を実施し、研修修了者には修了証〈ライセンス〉を授与する制度を確立しております。

上記は、施工現場で乾式戸境壁の耐火性能を確保するために施工管理体制を整備することを目的としており、この考え方は戸境壁以外の耐火壁を施工する際にも必要であることから、この「標準施工指導書」の内容に従い確実に施工することとします。

その他

1．この「標準施工指導書」は、必ず施工前に注意深く読み、よく理解してください。

2．この「標準施工指導書」はこの施工全般にわたって、いつでも確認できるように保管して置いてください。

[平成２６年４月版]

吉野耐火システム B15
標準施工指導書

T－002－2

目　次

[平成２６年４月版]

吉野耐火システム Ｂ15
標準施工指導書

Ｔ－００２－３

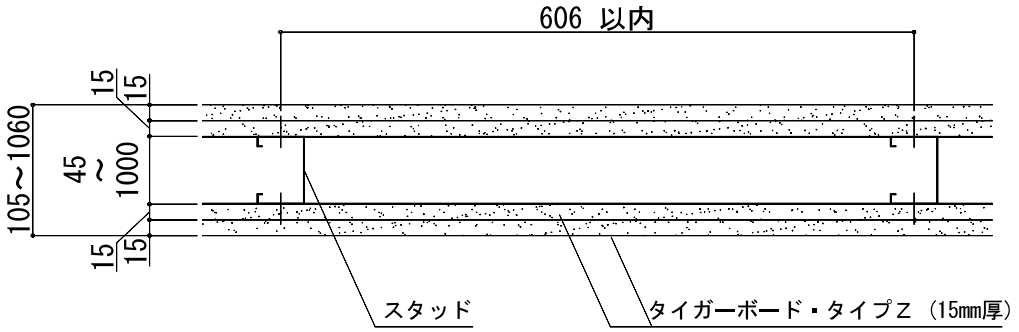
① 総 則

１－１ 適用範囲

この標準施工指導書は、吉野耐火システム Ｂ１５について適用する。

吉野耐火システム Ｂ１５
１時間耐火構造 国土交通大臣認定 ＦＰ０６０ＮＰ－０１７４（中空部に吸音材を挿入しない場合）
ＦＰ０６０ＮＰ－０１７５（中空部に吸音材を挿入する場合）

水平断面図 （中空部に吸音材を挿入しない場合の認定の仕様）



※標準のスタッド間隔は４５５㎜とする。
※壁高さに応じて選択されるスタッドの形状（４５形、５０形、６５形、７５形、９０形または１００形など）は異なります。
※本書の図面寸法値は各部材の公称寸法を記載しております。

１－２ 周知徹底

吉野耐火システム Ｂ１５の施工に際しては、この標準施工指導書にて、事前に説明会、その他の方法で、作業員全員に周知徹底を図る。

１－３ 施工

施工業者は、この標準施工指導書によって、正確、確実に施工しなければならない。
この標準施工指導書に明記されていない事項、または疑義が生じた場合は、吉野石膏（株）と協議し、施工方法を検討する。

１－４ 報告

施工業者は、工事が完了した時点で建設元請業者の監督員に報告し、検査を受ける。

② 安全対策

現場の作業は、安全を第一とし、各人が各々自覚した行動をとり、もし危険のある段取りや安全管理が徹底出来ない場合は、作業を中止してでも全員一体となって、安全管理を最優先し、最後まで無事故で工事を完了させることを基本とする。

《タイガーボード類の注意》
＊指定の用途以外にご使用の場合は性能を保証いたしかねます。
＊ボードを施工する際の切断作業では集塵などに留意し、防塵カッターや集塵丸鋸を使用してください。
また、サンディングなどの作業で発生する粉塵に対しては、防塵マスクや安全メガネの着用をおすすめします。
＊在庫の際、積層段数が多いと荷くずれの危険があります。
＊タイガーボード類の廃材、洗浄排水の処理については、環境公害とならないようにご注意ください。

③ ボードの荷姿、運搬、揚重、保管

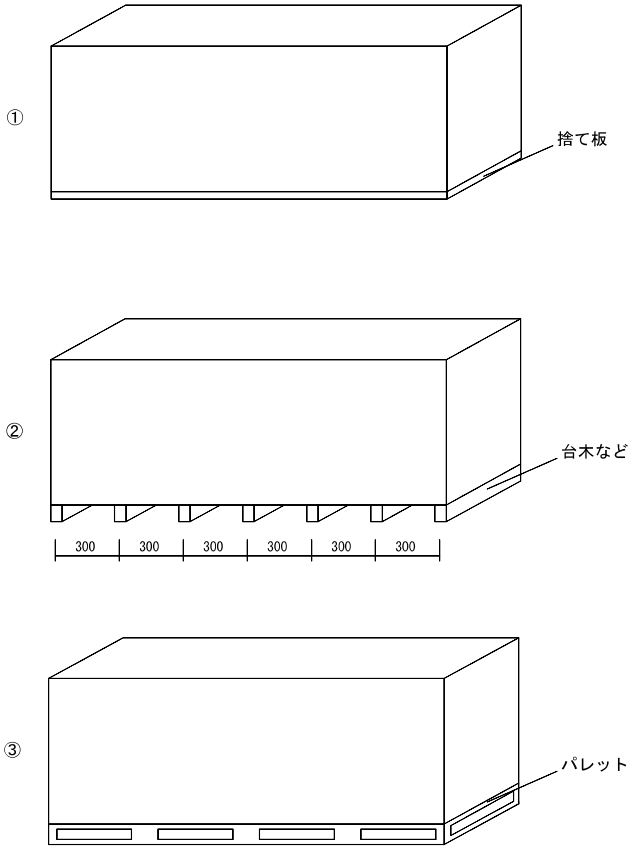
3－1 荷姿
保管荷姿は、通常強化せっこうボード（１５㎜)で８０枚を１山としてある。

3－2 運搬
強化せっこうボードなどの搬入は、建設元請業者の監督員との打ち合わせにより、現場の搬入計画にもとづいて行う。

3－3 揚重
各階への揚重は、現場設置のリフトなどで行い、現場の揚重基準に従う。

3－4 保管
（1）荷くずれ、角欠けがないように均等に置く。
（2）壁際より、最低１m以上離す。
（3）傾斜面、墨出し部には置かない。
（4）凸凹面や水漏れ部には置かない。上階から漏水の恐れがある場合は、あらかじめシートなどで養生する。

（5）強化せっこうボードなどの保管は、波打ち、そりがでないように下図のように、高さのそろった台上に保管し、ボードの縁が台からはみ出ないこと。また、各山の一番上のボードは裏面を上面とすること。



（※長尺品の場合は①または③とする）

（6）２段積みなどを行う場合は、台木の位置を１段目と２段目でそろえること。
（7）強化せっこうボードなどを踏み台にしないこと。

３－５　残材処理、清掃

強化せっこうボード、その他の残材は、各階ごとにあらかじめ決められている指定場所に毎日清掃し、集積しておく。

④ 材 料

４－１ 主構成材料

４－１－１ 強化せっこうボード(ＧＢ－Ｆ)

商品名：タイガーボード ・タイプZ （ 以下ＴＢＺと称する ）

（1） 規格 不燃NM－８６１５、ＪＩＳ Ａ ６９０１

（2） 寸法

厚 さ １５㎜

大きさ(標準) ９１０㎜×１,８２０, ２,４２０, ２,７３０㎜

（3） 性能

比 重 ０.７５以上

含水率 ３%以下

４－１－２ 上部および下部ランナー

ＪＩＳ Ｇ ３３０２またはＪＩＳ Ｇ ３３１３等

⊏－４５～1,０００×３０～７５×０.４㎜以上

４－１－３ スタッド（間柱）

ＪＩＳ Ｇ ３３０２またはＪＩＳＧ ３３１３等

⊏－４５～1,０００×４５～７５×０.４㎜以上

□－４５～1,０００×４０～５０×０.４㎜以上

壁高さと間柱の選定例（ＪＩＳ Ａ ６５１７のスタッドと振れ止めを使用した場合）

壁高さ２.７ｍまで ： ⊏－ ５０×４５×０.８㎜

壁高さ４.０ｍまで ： ⊏－ ６５×４５×０.８㎜ または⊏－７５×４５×０.８㎜

壁高さ４.５ｍまで ： ⊏－ ９０×４５×０.８㎜

壁高さ５.０ｍまで ： ⊏－１００×４５×０.８㎜

４－１－４ 振れ止め（必要に応じて取り付ける場合には下記のものを使用する）

ＪＩＳ Ｇ ３３０２またはＪＩＳ Ｇ ３３１３等

⊏－１９～２５×１０×０.９㎜以上

４－１－５ グラスウールなど（必要に応じて挿入する場合には下記のものを使用する）

グラスウール：ＪＩＳ Ａ ６３０１、ＪＩＳ Ａ ９５０４またはＪＩＳ Ａ ９５２１

密度１０kg/m^3 以上 厚さ１２㎜以上

ロックウール：ＪＩＳ Ａ ６３０１、ＪＩＳ Ａ ９５０４またはＪＩＳ Ａ ９５２１

密度１０kg/m^3 以上 厚さ２５㎜以上

４－２　副構成材料

４－２－１　ランナー固定用ピン

コンクリート釘：φ２．０㎜以上×１０㎜以上
バッファーピン：φ２．０㎜以上×１０㎜以上
その他固定用アンカーピースなど

４－２－２　スタッドスペーサー

ＪＩＳ Ｇ ３３０２またはＪＩＳ Ｇ ３３１３等に規定する板厚０．５㎜以上のもの。

４－２－３　タッピンねじ・ステープルなど

（１）タッピンねじ：防錆処理をしたもの。
φ３．５㎜以上×２５㎜以上
（２）ステープル：防錆処理をしたもの。
上張りＴＢＺの留め付け用ステープル　　幅４㎜以上×長さ２５㎜以上
グラスウールなどの留め付け用ステープル　　幅４㎜以上×長さ１６㎜以上など
（グラスウールなどの留め付け用にはスピンドルピン（長さ２５㎜以上）も使用可能）

４－２－４　接着材

無機質系接着材「タイガートラボンド」（吉野石膏製）または酢酸ビニル樹脂系接着材「吉野サクビボンド」など

４－２－５　継目処理などの材料（必要に応じて継目処理をする場合には下記のものを使用する）

（１）ジョイントコンパウンド（パテ）
「タイガーUライト」、「タイガーＦライト」、「タイガーＳＰライト」、「タイガーライト」、「タイガーVシールパテ」、「タイガーＧＬパテ」、「タイガーＵＰパテ」、「タイガーＦトップパテ」、「タイガーＳＰパテ」、「タイガーパテ」、「タイガージョイントセメント」（吉野石膏製）など
（２）ジョイントテープ
「タイガージョイントテープ」、「タイガーGファイバーテープ」など

４－２－６　充てん材

（１）耐火目地材
ロックウール　「タイガーロックフェルト」（厚さ１０㎜×幅１５㎜×長さ１，０００㎜）など
（２）無機質系充てん材
「タイガージプタイト」、「タイガージプシール」（吉野石膏製）など
（３）シーリング材
ウレタン系「タイガーUタイト」、変成シリコーン系「タイガー耐火シーラント」など

⑤ 施工要領

５－１ 標準施工手順

墨　　出　　し
↓
ラ ン ナ ー の 取り 付 け
↓
ス タ ッ ド 建 て 込 み
↓
振れ止めの取り付け（必要に応じて取り付ける場合に限る）
↓
A面　ランナー取合部の耐火目地材「タイガーロックフェルト」を充てん
↓
A面　下張りボード張り付け
↓
A面　上張りボード張り付け
↓
A面　上張りボード取合部の充てん（「タイガージプタイト」または「タイガーUタイト」）
↓
B面よりグラスウールなどの取り付け（必要に応じて挿入する場合に限る）
↓
B面　ランナー取合部の耐火目地材「タイガーロックフェルト」の充てん
↓
B面　下張りボード張り付け
↓
B面　上張りボード張り付け
↓
B面　上張りボード取合部の充てん（「タイガージプタイト」または「タイガーUタイト」）
↓
検　　査
↓
継 目 部 そ の 他 の 処 理（耐火認定上必須の処理ではありません）
↓
仕　上　げ　（耐火認定上必須の処理ではありません）
↓
検　　査
↓
引　き　渡　し

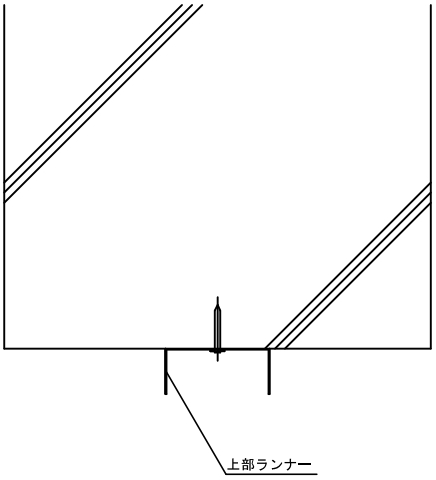
５－２　施工要領

５－２－１　墨出し

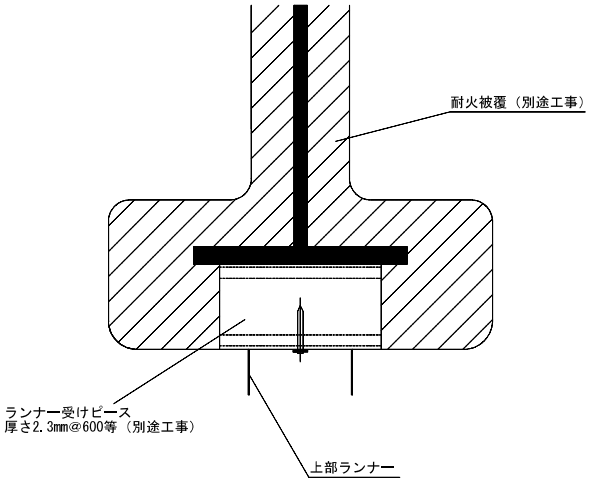
（１）墨打ち面に砂その他の汚れや凹凸がある場合は、事前によく清掃してから墨出しをする。
（２）躯体の芯墨、または返り墨から所定の間仕切壁の芯墨を出し、取り付けランナーの面墨を上、下スラブ面に出す。
（３）間仕切の長さが長いところでは、直線度に特に注意する。
（４）墨出し終了後、墨出し位置をチェックした後、建築元請業者の監督員の承認を受ける。

５－２－２　ランナーの取り付け

（１）上部および下部ランナーは、正確に墨出しされたスラブ面などに固定用ピンなどで固定する。
（２）固定用ピンは、ランナーの端部より約５０㎜の位置に打ち、中間部は９００㎜以内の間隔で固定する。
（３）耐火被覆される鉄骨梁に上部ランナーを取り付ける場合は、耐火被覆工事に先立ってランナー受けのピース材を溶接などにより固定し、上部ランナーを取り付け、鉄骨の耐火被覆を施工する。



＜天井スラブおよびＲＣへのランナー取り付け＞



＜鉄骨梁へのランナーの取り付け＞

（４）上部および下部ランナーは、壁または柱などへは突き付けずに約１０㎜離す。

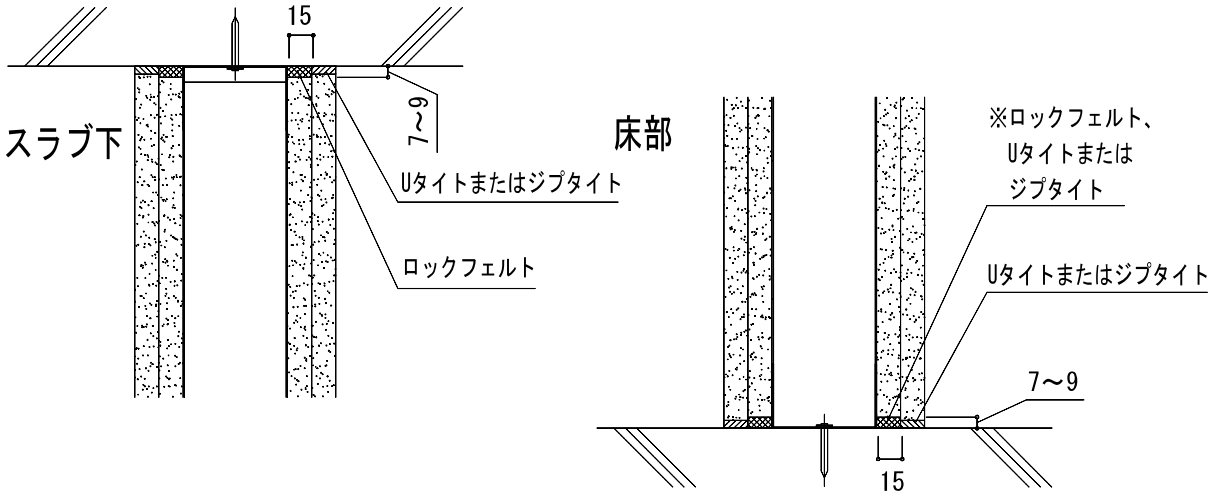
５－２－３　スタッドの建込み

（１）スタッドは上部および下部ランナーの内法高さ寸法より少し短く切断(約１０㎜)する。スタッドの形状は、壁高に応じて選定する。
（２）スタッドは、６０６㎜以内の間隔で取り付ける（標準は、４５５㎜)。
（３）振れ止めは、必要に応じて約１，２００㎜の間隔で取り付ける。
（４）スタッドスペーサーは、６００㎜以内の間隔で取り付ける。

５－２－４　耐火目地材の充てん

（１）ＴＢＺを下張りする前に、スラブ下、梁下、壁、床などの取合部に「タイガーロックフェルト」（厚１０㎜×幅１５㎜×長さ１，０００㎜）を張り付ける。

（２）「タイガーロックフェルト」は躯体面に取り付け、つなぎ目の部分にすき間が生じないように十分注意する。



※床部の下張りに「タイガーUタイト」を使用した場合は、上張りに、必ず「タイガージプタイト」を使用する。

５－２－５　下張りＴＢＺの張り付け

（１）ＴＢＺは横張りまたは縦張りとし、出来るだけロスが少なくなるように割り付ける。

（２）ＴＢＺは、スラブ下、梁下、壁、床などに張り付けてある「タイガーロックフェルト」を軽く押しつぶすようにしながらスタッドにタッピンねじで留め付ける。留め付けの際、「タイガーロックフェルト」の間にすき間が生じないように十分注意する。
床部に「タイガーロックフェルト」を使用しなかった場合は、ＴＢＺと床スラブの間に５㎜程度の目透かしを設けて留め付ける。目透かし部に「タイガージプタイト」または「タイガーUタイト」等をすき間が残らないように充てんする。ただし、上張り張り付け時の＜５－２－７取合部の処理＞において「タイガージプタイト」を使用しない場合は必ず下張りに目透かし部には「タイガージプタイト」を使用する。

（３）ＴＢＺはスタッドと接した部分に不陸が生じないように調整しながら、タッピンねじで２００㎜ 以内の間隔で留め付ける。ねじ頭は、ＴＢＺ表面より軽く凹ませる。タッピンねじの位置がＴＢＺの端部にあり過ぎると、ＴＢＺの端欠けにより縁が破損するので注意する。

（４）ＴＢＺ同士の目地部は、すき間のないように互いに突き付け張りとする。

５－２－６　上張りＴＢＺの張り付け

（１）ＴＢＺは原則として縦張りとし、下張りのＴＢＺと目地が重ならないように割り付ける。

（２）ＴＢＺは、コンクリート壁などとの接合部は、５㎜以内の目透かしとなるように調整する。

（３）ＴＢＺの留め付けは、無機質系接着材「タイガートラボンド」または酢酸ビニル樹脂系接着材「吉野サクビボンド」などを１５０g/㎡以上点付けし、ステープルで留め付ける。ステープルの間隔は、２００㎜以内で１箇所あたり１本以上とする。

（4）階段室やエレベーターシャフト内側にＴＢＺを張る場合は、風圧や地震を考慮し、必要に応じてφ３．５㎜以上×４０㎜以上のタッピンねじでスタッドに約６００㎜以内の間隔で留め付ける。
（5）ＴＢＺ同士の目地部は、すき間のないように互いに突き付け張りとする。

５－２－７　取合部の処理
（1）上張りＴＢＺの張り付け終了後、スラブ下、梁下、壁、床などの取合部は、「タイガージプタイト」または「タイガーUタイト」などですき間のないように充てんする。ただし、床部の下張り取合部に「タイガーUタイト」を使用した場合には、必ず「タイガージプタイト」を使用する。
（2）吹付け耐火被覆との取合部は「タイガージプシール」などですき間のないよう充てんする。

５－２－８　グラスウールなどの挿入（挿入する場合に限る）
（1）片面の取合部の処理後、中空部にグラスウールなどを挿入し、下張りＴＢＺにステープルまたはスピンドルピンでズレ落ちないように留め付ける。
（2）グラスウールなどはスタッドのスペーサー部に接する部分に切り込みをいれ、スタッド内および上下ランナー内に差し込むようにしてすき間の出ないように充てんする。

５－２－９　継目部の処理（必要に応じて処理する場合に限る）
上張りＴＢＺの継目部等は、ジョイントテープ「タイガージョイントテープ」、「タイガーGファイバーテープ」とジョイントコンパウンド（パテ）「タイガーUライト」、「タイガーＦライト」、「タイガーＳＰライト」、「タイガーライト」、「タイガーＶシールパテ」、「タイガーＧＬパテ」、「タイガーＵＰパテ」、「タイガーＦトップパテ」、「タイガーＳＰパテ」、「タイガーパテ」、「タイガージョイントセメント」などを用いて仕上げる。

５－２－１０　仕上げ（必要に応じて処理する場合に限る）
ペイント、壁装材貼り、吹付けなどで仕上げる。

５－２－１１　その他設計、施工上の留意点
（1）この標準施工指導書は、認定書の中から当社が推奨する材料を明記してあります。
（2）外壁や最上階スラブ下などに発泡系断熱材を施工する場合は断熱工事に先立って当壁構造を施工する。
（3）ＲＣ梁下に当壁構造を設ける場合は、上部ランナー留め付けピンの保持力が低下しないように、壁の芯が梁際から８０㎜程度以上内側にくるように配置するか、上部ランナー固定用アンカーピースなどを埋込みとする。
（4）ランナー受けピースなどを鉄骨梁に溶接する場合は、鉄骨母材を傷めないように配慮してください。
（5）フラット型デッキプレート下に当壁構造が直交、平行にくる場合、壁芯の左右２５０㎜程度に当たるデッキの山はカットし、壁がスラブまで当たるようにする。（納まり図参照）
（6）デッキプレートに上部ランナーを取り付けた場合のデッキプレート凹部の中空層と上部ランナーとの納まりについては以下の方法で処理をする。
① デッキプレート凹部の中空層にロックウール１５０kg／m^3をすき間なく充てんする。次にロックウール部分に「タイガージプシール」をへらなどで押しつけながらすき間なく塗り付ける。「タイガージプシール」の塗り厚は、上張り＋下張りの厚さ以上とする。
② デッキプレート凹部の中空層にロックウール１５０kg／m^3をすき間なく充てんする。その両側には１２．５㎜厚せっこうボード１枚をデッキプレート下の上張り面材に接着材とステープルなどで留め付ける。

（7）当壁構造は非耐力間仕切壁構造のため、その四周処理法は躯体の変形等による外力が間仕切壁に伝わらないことを前提として取合部処理、目透かし寸法などを決めております。柱、梁などの躯体の変形（床スラブのクリープ含む）は一様ではなく、地震の大きさや建物の構造、またはその他の要因により大きく異なりますので、変形が予想される場合には別途、納まりをご検討ください。

（8）当壁構造に電気ボックス類は、取り付けない。

（9）当壁構造にドアを取り付ける場合は、開口部補強材を独立して、床、スラブ下、梁などの躯体に直接固定用ピンまたは溶接などにより固定する。

（10）高層建築物が強風等により揺れて、当壁構造にきしみ音低減対策が必要な場合は、別途ご検討ください。

（11）亜鉛めっき鋼板等は、スタッドと下張り材または下張り材と上張り材との間に取付ける場合は、厚さ０．１１～２．３㎜とする。

⑥ 検 査

６－１ 自主検査

工 程	項 目	要 点	方 法	基 準	管理方式
墨 出 し	基準墨	寸 法	コンベックス	±２．０㎜	チェック検査
ランナー取り付け	固定用ピン	間 隔	コンベックス	９００㎜以内	
間柱取り付け	間柱の垂直度	寸 法	下げ振り水準器	±２．０㎜	
	割り付け	間 隔	コンベックス	６０６㎜以内	
ＴＢＺ 取り付け(下張り)	突き付け	目違い	定 規	２．０㎜以内	
	目 地	すき間	目 視	すき間がないこと	
	タッピンねじ	間 隔	スケール	２００㎜以内	
ＴＢＺ 取り付け(上張り)	突き付け	目違い	定 規	１．５㎜以内	
	目 地	すき間	目 視	すき間がないこと	
	接着材	重 量	秤または容器	１５０g/㎡以上	
	ステープル	間 隔	スケール	２００㎜以内	
グラスウールなど	挿 入	すき間	目 視	すき間がないこと	
壁 端 部	充てん	すき間	ライト	透過光のないこと	

６－２ 立合検査

立合検査は、建設元請業者の監督員の指示に基づいて行う。

認　定　書

国住指第 3567 号
平成 20 年 12 月 25 日

吉野石膏株式会社
代表取締役社長　須藤 永一郎　様

国土交通大臣　　金子　一義

下記の構造方法等については、建築基準法第 68 条の 26 第 1 項（同法第 88 条第 1 項において準用する場合を含む。）の規定に基づき、同法第 2 条第七号及び同法施行令第 107 条第二号（間仕切壁（非耐力壁）：1 時間）の規定に適合するものであることを認める。

記

1. 認定番号
　FP060NP-0174

2. 認定をした構造方法等の名称
　両面強化せっこうボード重張／軽量鉄骨下地間仕切壁

3. 認定をした構造方法等の内容
　別添の通り

（注意）この認定書は、大切に保存しておいてください。

認　定　書

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記

1. 認定番号
　FP060NP-0175

2. 認定をした構造方法等の名称
　人造鉱物繊維断熱材充てん／両面強化せっこうボード重張／軽量鉄骨下地間仕切壁

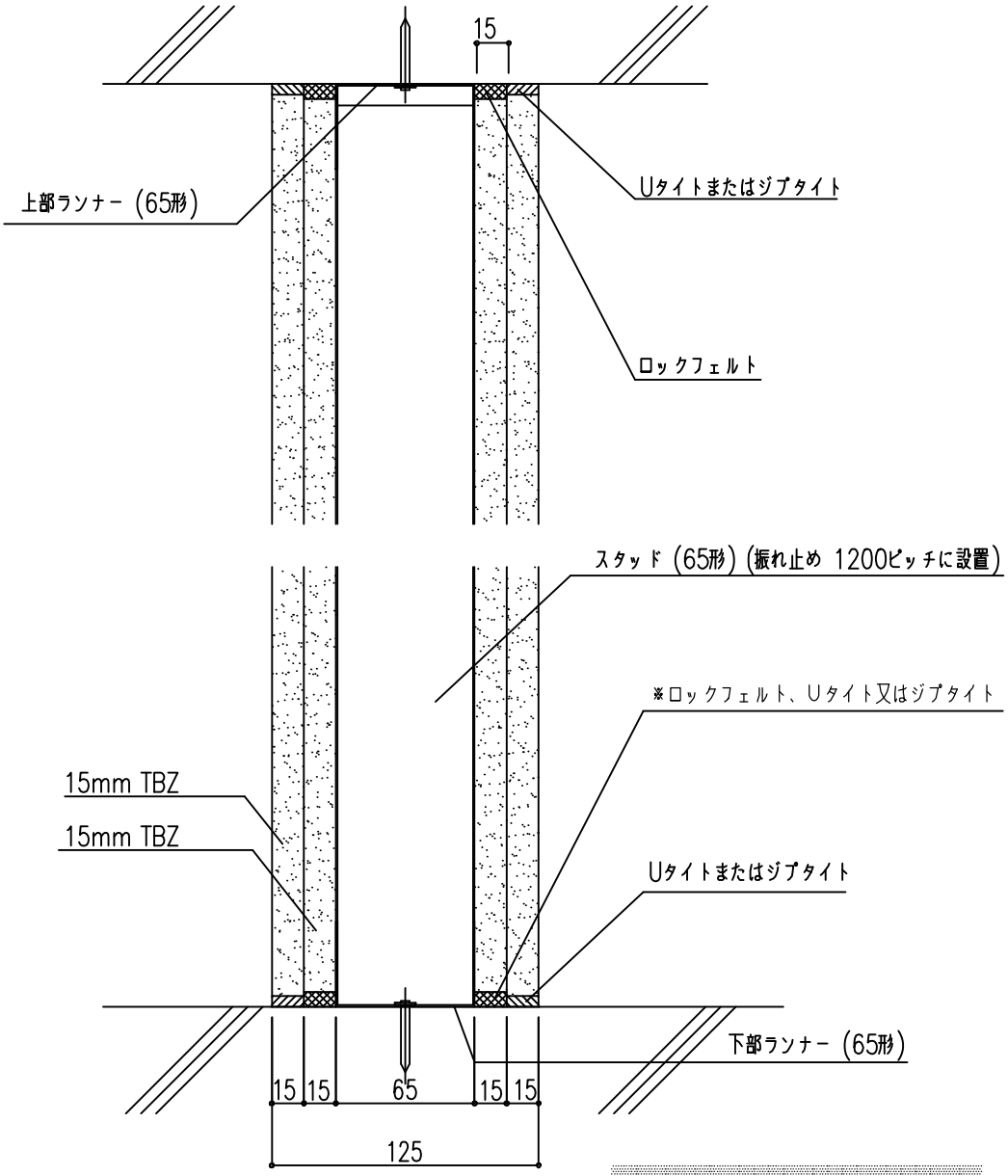
3. 認定をした構造方法等の内容
　別添の通り

（注意）この認定書は、大切に保存しておいてください。

吉野耐火システム　Ｂ１５
標準施工指導書

Ｔ－００２－ １５

標準垂直断面図



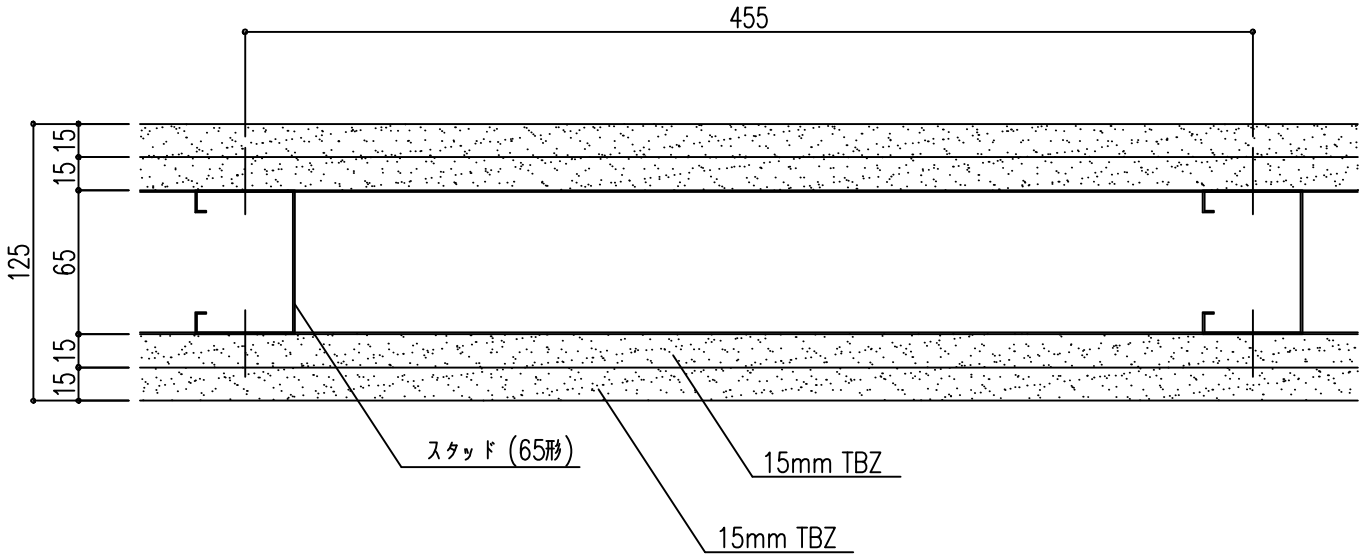
振れ止めは必要に応じて
1200ピッチに設置する

※床部の下張りにUタイトを使用した場合は、上張りに必ずジプタイトを使用する。

図面名　コンクリートスラブ、床との納まり

［平成２６年４月版］

標準水平断面図



※耐火認定上のスタッド間隔は606mm以内
標準のスタッド間隔は455mmとする。

図面名　水平断面図

［平成２６年４月版］

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APPENDIX B

COMMON JAPANESE AND ENGLISH NAMES FOR PLANTS

Table 1: Plant Species Types and Names

LATIN NAME	JAPANESE NAME	ENGLISH NAME
EVERGREEN CONIIFER		
Araucaria Heterophylla	Kobano Nanyousugi	Norfolk Island Pine
Pinus Iuchuensis	Rykyu Matsu	None
BROAD LEAF EVERGREEN		
Cinnamomum Camphora	Kusunoki	Comphor Tree
Farfugium Japonicum	Tsuwabuki	None
Juniperus Taxifolia	Okinawa Hainezu	None
Ophiopogon Japonicas	Janohige	None
SMALL EVERGREEN CONIFER		
Podocarpus Macrophyllus	Inumaki	Yew Podocarpus
Ficus Benghalensis	Bengaru Bodaiju	Banyan Tree
Ficus Benjamina	Shidare Gajumaru	Weeping Fig
Ficus Religiosa	Indo Badaiju	Bo Tree
SMALL BROAD LEAF EVERGREEN		
Acacia Confuse	Soushiju	None
Camellia Japonica	Yabutsuibaki	Camellia
Cinnamomum Japonicum	Yabunikkei	None
Citrus Depressa	Hirami Remon	None
Diospyros Ferrea	Ryukyu Kokutan	None
Distylium Racemosum	Isunoki	None
Distylium Racemosum	Kuroganemochi	None
Elaeocarpus Decipiens	Horutonoki	None
Garcinia Subelliptica	Fukugi	None
Grevillea Robusta	Sinobunoki	Silk Oak
Myrica Rubra	Yamamomo	Strawberry Tree
Persea Thunbergii	Tabunoki	None
BROAD LEAF DECIDIOUS TREE		
Bombax Ceiba	Kiwatanoki	Cotton Tree
Cassia Fisulosa	Nanban Saikachi	Golden Shower Tree
Chorisia Speciose	Tokkuri Kiwata	Floss Silk Tree
Delonix Regia	Hououboku	Royal Poinciana
Erythrina Variegate	Deigo	Coral Tree
Jacaranda Mimosaefolia	Shiunboku	Green Ebony
Lagerstroemia Speciose	Oobana Sarusuberi	Queen Crape
Melia Azedarach	Sendan	China Tree
Spathodea Campanulata	Kaenboku	African Tulip Tree
Tabebuia Avellanedae	Ippei	New World Trumpet Tree
Terminalia Catappa	Kobateishi	Oliver Bark Tree
SMALL BROAD LEAF DECIDIOUS TREE		
Albizzia Lebbek	Birumanemu	Lebbeck Tree
Bauhinia Purpurea	Murasaki Soshinka	Butterfly Tree
Erythrina Crista-Galli	Maruba Deigo	Common Coral Tree
Fraxinus Griffithii	Shimatoneriko	None
Lagerstroemia Indica	Sarusuberi	Crape Myrtle

LATIN NAME	JAPANESE NAME	ENGLISH NAME
Lagerstroemia Subcostata	Shima Sarusuberi	None
Liquidambar Formosana	Fu	None
Morus Australis	Shimaguwa	None
Pongamia Pinnata	Kuroyona	Wild Bean
Prunus Campanulata	Hikanzakura	Cherry Tree
Sapium Sebiferum	Nankinhaze	Chinese Tallow Tree
SMALL PALM TREE		
Chrysalidocarpus Lutescens	Areak Yashi	Butterfly Palm
Mascarena Legenicaulis	Tokkuri Yashi	Bottle Palm
Mascarena Verschaffeltii	Tokkuri Yashi Modoki	Verschaffelt Bottle Palm
Phoenix Roebelenii	Shinnou Yashi	Dwarf Date Palm
LARGE PALM TREE		
Archontophoenix Alexandrae	Yusura Yashi	Alexandra Palm
Livistona Chinesis	Birou	Chinese Fan Palm
Roystonea Regia	Daiou Yashi	Cuban Royal Palm
HIGH SHRUB		
Ardisia Ellipiea	Seiron Manryou	None
Caesalpinia Pulcherrima	Oogochou	Peacock Flower
Callistemon Rigidus	Makiba Burashinoki	Stiff Bottle Brush
Cassia Suraftensis	Mokusenna	Glaucos Cassia
Cestrum Nocturnum	Yakouboku	Night Blooming Jasmine
Clerodendron Japonicum	Higiri	Pagoda Flower
Duranta Erecta	Taiwan Rengyou	Pigeon Berry
Euphorbia Pucherrima	Shoujouboku	Poinsettia
Gardenia Jasminoides	Kuchinashi	Gardenia
Hibiscus Mutabilis	Fuyou	Cotton Rose Hibiscus
Hibiscus Syriacus	Mukuge	Rose Of Sharon
Hibiscus Tiliaceus	Oohamabou	None
Jatropha Hastate	Teikinzakura	None
Juniperus Chinensis	Kaizuka Ibuki	Hollywood Juniper
Ligustrum Japonicum	Nezumimochi	Japanese Privet
Messerschmidia Argentea	Monpanoki	Velvetleaf
Viburnum Odoratissimum	Sangoju	None
LOW SHRUB		
Abelia X Grandiflora	Aberia	Glossy Abelia
Acalypha Wilensian	Akarifa	Copper Leaf
Antidesma Pentandrum	Shimayamahihatsu	None
Buxus Microphylla	America Tsuge	Box Wood
Cassia Coluteoids	Kobanosenna	None
Codiaeum Variegatum	Kuroton	Croton
Eurya Emarginata	Hamahisakaki	None
Ficus Microcarpa	Oogon Gajumaru	Chinese Banyan
Ixora Chinensis	Sandanka	Red Ixora
Lespedeza Liukiuensis	Ryukyu Hagi	None
Malvaviscus Arboreus	Himefuyou	Turks Cup
Murraya Paniculata	Gekkitsu	Cosmetic Bark Tree
Pittosporum Tobira	Tobera	Japanese Pittosporum
Raphiolepis Unbellata	Sharinbai	None
Rhododendron Hybrids	Hirado Tsutsuji	Snow Azalea
Rhododendron Indicum	Satsuki	Lateritium

LATIN NAME	JAPANESE NAME	ENGLISH NAME
Rhododendron Scabrum	Kerama Tsutsuji	Azalea
Viburnum Suspensum	Gomoju	None
SHRUB OF A SPECIAL KIND		
Cycas Revoluta	Sotetsu	Japanese Sago Palm
Pandanus Utilis	Fuchibeni Takonoki	Common Screwpine
Pandanus Odoratissimus	Adan	Screw Pine
VINE		
Allamanda Cathartica	Ariiake Kazura	Allamanda
Anigonon Leptopus	Nitobe Kazura	Coral Creeper
Bougain Villea	Bugenbiria	Bougainvillea
Fivus Pumila	Ooitabi	Prumila
Parthenocissus Heterophylla	Amamizuta	Boston Ivy
Passiflora Edulis	Tokeiso	Passion Fruit
Piper Retrofractum	Hihatsumodoki	None
Pseudocalymma Alliaceum	Ninniku Kazura	Garlic Vine
Pyrosteia Miers	Kaen Kazura	Orange Trumpet Vine
Thunbergia Gandiflora	Bengaru Yahazu Kazura	Clock Vine
GROUND COVER		
Alpinia Purpuata	Reddo Jinja	Red Giner
Canna Generalis	Kanna	Canna
Chlorophytum Elatum	Hiroha Orizururan	Milkey Way
Crossostephium Chinense	Mokubyakkou	None
Farfugium Japonicum	Tsuwabuki	None
Hymenocallis Littoralis	Sasakaniyuri	Spider Lilly
Juniperus Taxifolia	Okinawa Hainezu	None
Lantana Camara	Rantana	Lantana
Ophiopogon Japonicas	Janohige	None
Wedelia Trilobata	Wederia	Creeping Daisy
Zephyranthes Candida	Canna	Tamasudare
Zoysia Tenuifolia	Kouraishiba	Manila Grass

APPENDIX C

BRACING AND SPECIAL INSPECTION OF NONSTRUCTURAL COMPONENTS

1. Bracing of non-structural components addresses two issues:

    - Life Safety such as acoustical ceiling falling to the floor preventing occupants from escaping or light fixtures, VAV, unit heater components falling on an occupant during a seismic event.
    - Failure of non-structural connections may seem minor, but they can result in disruptive nonstructural damage to the component resulting in economic and functionality loss of the building. The risk of fire also increases during an earthquake, further endangering the occupants. Structural damage is a rare event, but nonstructural failures accounts for the majority of earthquake damage.

2. Nonstructural components consist of architectural, mechanical, electrical and plumbing utilities. ASCE 7-10, Chapter 13 establishes the minimum design criteria for nonstructural components permanently attached to structures:

    - Component – the architectural, mechanical, electrical, equipment and plumbing utilities.
    - Support – the method to transfer the loads from the component to the structure.
    - Attachment – the method of actual attachment to the structure.
    - Importance Factor (Ip) – identifies which components are required to be fully functioning during and after a seismic event. Components with an Ip = 1.5 are classified as a “Designated Seismic System” (DSS) per ASCE 7-10, 13.1.3.

    Mechanical and electrical components consist of floor-mounted and suspended equipment. It also includes suspended distributed utilities such as ducts, pipes, conduit or cable trays. These components are essential in providing the necessary function of a building. Nonstructural components in a Hospital, Fire Station, Air Traffic Control Tower are required to be fully functioning both during and after a seismic event. A disruption of these components can make an entire building unusable. In order for a building to properly service the needs of the military after a seismic event, fully functioning components are essential.

3. There are four (4) methods of identifying “Special Inspections”:
    - IBC 2015, Chapter 17
    - DSS components as determined in ASCE 7-10, Chapter 13.
    - Manufacturer requirements per IBC 2015, 1705.1.1.
    - UFC 3-301-02 Structural engineering and UFC 3-310-04 Seismic Design of Buildings.

    Special Inspections and identification of DSS components shall be developed by the DOR per IBC 2015, 1704.3 and listed in 01 45 35 “Statement of Special Inspections” (DSS) and “Schedule of Special Inspections”. Buildings located in Seismic Design Category = E and assigned to Risk Category III or IV (reference S-001 for seismic values) will require a Special Inspector of record (SIOR). This individual is a licensed engineer, independent third party hired by the Prime Contractor and responsible for the supervision of all “Special Inspections”. Special Inspections in Seismic Design Category = E and assigned a Risk Category = I or II shall be conducted by a qualified person hired by the Prime Contractor.

4. USACE Construction shall notify JED Design Branch after the SIOR has made his final walkthrough and has submitted a final comprehensive report that documents all Special Inspections are completed and discrepancies corrected. Design Branch along with Construction will conduct a walk-down inspection of installed Designated Seismic Systems. The inspection team will be comprised of design professionals who are familiar with the installation of mechanical, electrical, and fire protection components and their vulnerabilities to earthquakes.
    a. Record/observations of final walk-down inspection.
    b. Document all required inspections were performed in accordance with the Statement of Special Inspections.
    c. Document that the Designated Seismic Systems were installed in accordance with the construction documents.

APPENDIX D

MCIPAC-MCB / PROTECTIVE DESIGN CENTER TECHNICAL REPORT

ITEM NO. 1:
MCIPAC-MCB Camp Butler BULLETIN 3302, "Supplement to Unified Facilities Criteria 4-010-01 Minimum Antiterrorism Standards for Buildings in Japan"

ITEM NO. 2:
Protective Design Center Technical Report PDC-TR 12-08 Rev 3, "Standoff Distances for Japanese Conventional Construction"

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UNITED STATES MARINE CORPS
MARINE CORPS INSTALLATIONS PACIFIC-MCB CAMP BUTLER
UNIT 35001
FPO AP 96373-5001

Canc frp: Sep 2023

MCIPAC-MCBBBul 3302
G-3
9 Sep 2022

MARINE CORPS INSTALLATIONS PACIFIC-MCB CAMP BUTLER BULLETIN 3302

From: Commanding General, Marine Corps Installations Pacific-MCB Camp Butler
To: Distribution List

Subj: MARINE CORPS INSTALLATIONS PACIFIC-MCB CAMP BUTLER SUPPLEMENT TO UNIFIED FACILITIES CRITERIA 4-010-01 DEPARTMENT OF DEFENSE MINIMUM ANTITERRORISM STANDARDS FOR BUILDINGS

Ref: (a) UFC 4-010-01 DOD Minimum Antiterrorism Standards for Buildings
(b) USPACOMINST 0536.2 USPACOM Antiterrorism Program
(c) UFC 4-020-01 Security Engineering Facilities Planning Manual
(d) PDC-TR 12-08 Japanese Construction Standards
(e) USFJI 31-201 Antiterrorism Program
(f) MCO 5530.14A Marine Corps Physical Security Program Manual
(g) UFC 4-022-02 Selection and Application of Vehicle Barriers
(h) UFC 4-022-03 Security Fences and Gates

Encl: (1) Table 1-1, Supplemental AT Standoff Distances

1. Situation. Marine Corps Installations Pacific-MCB Camp Butler (MCIPAC-MCBB) Policy Letter 3-19, addressed levels of protection and standoff distances for buildings with a routine occupation of 200 or more Department of Defense (DoD) personnel. However, the policy did not identify criteria for a Significant Occupancy Building (SOB), which is addressed in this Bulletin.

2. Cancellation. MCIPAC-MCBB Policy Letter 3-19.

3. Mission. Establish MCIPAC-MCBB supplemental Antiterrorism (AT) Standards for construction project security-related spatial requirements in accordance with minimum required Design Basis Threats (DBT).

4. Execution

a. Commander's Intent and Concept of Operations

(1) Commander's Intent. This Bulletin applies to new construction and to renovations of existing facilities if, after a security analysis is conducted, it is determined that a more robust AT posture is required. These supplemental standards exceed the minimum AT Standoff Distances and Levels of Protection (LOP) required by reference (a) for the special categories of buildings identified in this Bulletin.

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(2) Concept of Operations

(a) Reference (a) establishes minimum engineering security standards for DoD construction projects in a "zero-threat" operating environment. These standards are not associated with an identified DBT explosives weight or LOP. Reference (a) explains that Installation Commanders may determine a local DBT as the first step in planning AT requirements for construction projects. However, the minimum DBT for the Indo-Pacific Area of Responsibility (AOR) has been determined by U.S. Indo-Pacific Command (USINDOPACOM) in reference (b).

(b) Physical security requirements for construction are not affected by the publication of this Bulletin.

(3) Coordinating Instructions

(a) Installation Master Plans shall incorporate the USINDOPACOM directed DBT for buildings and facilities as stated in reference (b), paragraph 9.8., subparagraph b. Site planning will include AT Standoff Distances listed in enclosure (1) from base perimeters and Entry Control Facilities (ECF).

(b) MCIPAC-MCBB shall use the DBT stated in reference (b) for construction projects aboard Marine Corps Installations in Japan. The following engineering requirements shall be applied to new construction projects and to the renovation of existing facilities when practical.

(c) Levels of Protection (LOP). The following types of facilities shall be evaluated against the DBT specified in reference (b) and afforded the subsequent LOP:

1. Mass Gathering Building (MGB). Per reference (a), a building is considered inhabited if it is routinely occupied by 11 or more DoD personnel and with a population density of greater than one person per 430 gross square feet (40 gross square meters). A MGB is a localized MCIPAC-MCBB term that designates and describes buildings or occupied portions of buildings in which the minimum occupied area is 4,000 square meters or greater, is routinely occupied by 200 or more DoD personnel, and with a population density of one person per 40 square meters or greater.

a. Buildings that meet the criteria for an MGB will, at a minimum, be afforded a Low LOP, which will increase the AT Standoff Distance from the installation perimeter fence and uncontrolled on-base parking and roads.

b. AT Standoff Distances will be in accordance with Explosives Weights I and II and shall be applied to master planning and site placement. AT Standoff Distance refinement shall be completed in project criteria development and design criteria using references (a), (c), (d) and enclosure (1).

2. Significant Occupancy Building (SOB). SOB is a MCIPAC-MCBB term defined as a building that does not meet the criteria of a MGB, but to which MGB AT Standards may be applied because of special circumstances. Construction Security Planners and Antiterrorism Officers may recommend construction projects that include buildings with a routine occupancy of 50-199 personnel, a minimum occupied area of less than 4,000 square meters, or which may have a population density of less than one person per 40 square meters, for consideration to be afforded a Low LOP or higher. Final determination for the application of a Low LOP or higher to a specific construction project will be made by the MCIPAC-MCBB Director of Installation Protection. Meeting the below criteria warrants consideration but does not guarantee the project eligibility for designation as a SOB.

a. Considerations for a project to be designated a SOB are subjective and require evaluation to determine the feasibility of applying a Low LOP. Considerations may include, but are not limited to:

(1) Project Location. The location of the project may increase the vulnerability of the structure to the USINDOPACOM DBT compared to other similar structures. For example, proximity to the perimeter fence; high-speed avenues of approach; routine activities at the facility that may establish a predictable and easily observable pattern of activity that terrorists could recognize through surveillance and exploit compared to other similar facilities.

(2) Project Type. The type of facility may create a greater likelihood of a terrorist attack. For example, unit headquarters; barracks; schools or other facilities for children; Task Critical Assets or Mission Essential Vulnerable Areas; or the facility may have a political, religious, or cultural significance to a specific terrorist group.

(3) Potential Casualties. There is a potential that casualties resulting from an attack on this structure would produce a significantly high degradation of the morale of active duty forces.

(d) Process. During the concept design phase of a construction project, security planners or Antiterrorism Officers will assess the construction project against known threats, vulnerabilities, and criticalities. If the assessment concludes a construction project should have a Low LOP versus a Very Low LOP, security planners will submit a written request, which can be in the form of an email, to the MCIPAC-MCBB Director of Installation Protection. The written request should include justification and reasons as to why the facility should be designated a Low LOP and may include maps and drawings to support the request. The MCIPAC-MCBB IP Director will respond with a Memorandum for Record designating SOB status of a building.

(e) Other Buildings and Facilities. These include buildings or facilities that do not meet the definition of a MGB or SOB, such as Inhabited Buildings and High Occupancy Family Housing as defined in reference (a). These locations shall comply with the minimum requirements listed in reference (a) and will normally be afforded a Very Low LOP. Always consider the application of security measures higher than the minimum standards when planning construction projects if the project scope and spatial requirements allow.

(f) Design Basis Threat. Terrorist threats addressed in reference (a) are assumed to be directed against DoD personnel. In accordance with references (b) and (e), MCIPAC-MCBB installations in Japan will use two distinct explosive weights associated with a potential stationary or moving Vehicle-Borne Improvised Explosive Device (VBIED). Specific explosive weights are exempt from mandatory disclosure under the Freedom of Information Act and shall be marked and handled as Controlled Unclassified Information (CUI). Explosive weights may be considered classified information when associated with a specific facility as required by a classification authority.

1. Explosive Weight I applies to all MGBs and designated SOBs as measured from the controlled camp perimeter fence as depicted in enclosure (1).

2. Explosive Weight II applies to all MGBs and designated SOBs as measured from roads and parking within the controlled camp perimeter as depicted in enclosure (1).

3. New construction and renovations of more than 50 percent Plant Replacement Cost (PRC) will require AT Standoff for Explosive Weight II. This requirement can be enforced with anti-vehicle barriers. Barriers can be man-made, natural, landscaping features, or a combination of these.

This includes barriers to control access to maintenance and emergency roads that intrude into AT Standoff Distances. Consult references (f), (g), and (h) for more information on vehicle barriers. Facility planners will consult with Installation and Camp Antiterrorism Officers (ATO) and security planners to ensure camp and station AT barrier plans are considered during the concept phase of a new construction project or the renovation of an existing building. This ensures that requirements, such as vehicle parking, are not restricted by anti-vehicle barriers or other security equipment deployed by the Installation at higher Force Protection Conditions (FPCON) or higher threat levels.

5. Administration and Logistics. Recommendations concerning the contents of this Bulletin shall be forwarded to the MCIPAC-MCBB Director of Installation Protection.

6. Command and Signal

a. Command. This Bulletin applies to all new construction projects aboard U.S. Marine Corps installations, Camps, Stations, and facilities in Japan. Other construction projects that are renovations of existing buildings or building additions will normally be planned in accordance with references (a) and (d) but may be considered for designation as a MGB or SOB based on an approval from the MCIPAC-MCBB Director of Installation Protection. Physical security requirements for construction are not affected by the publication of reference (a) or this Bulletin.

b. Signal. This Bulletin is effective the date signed.

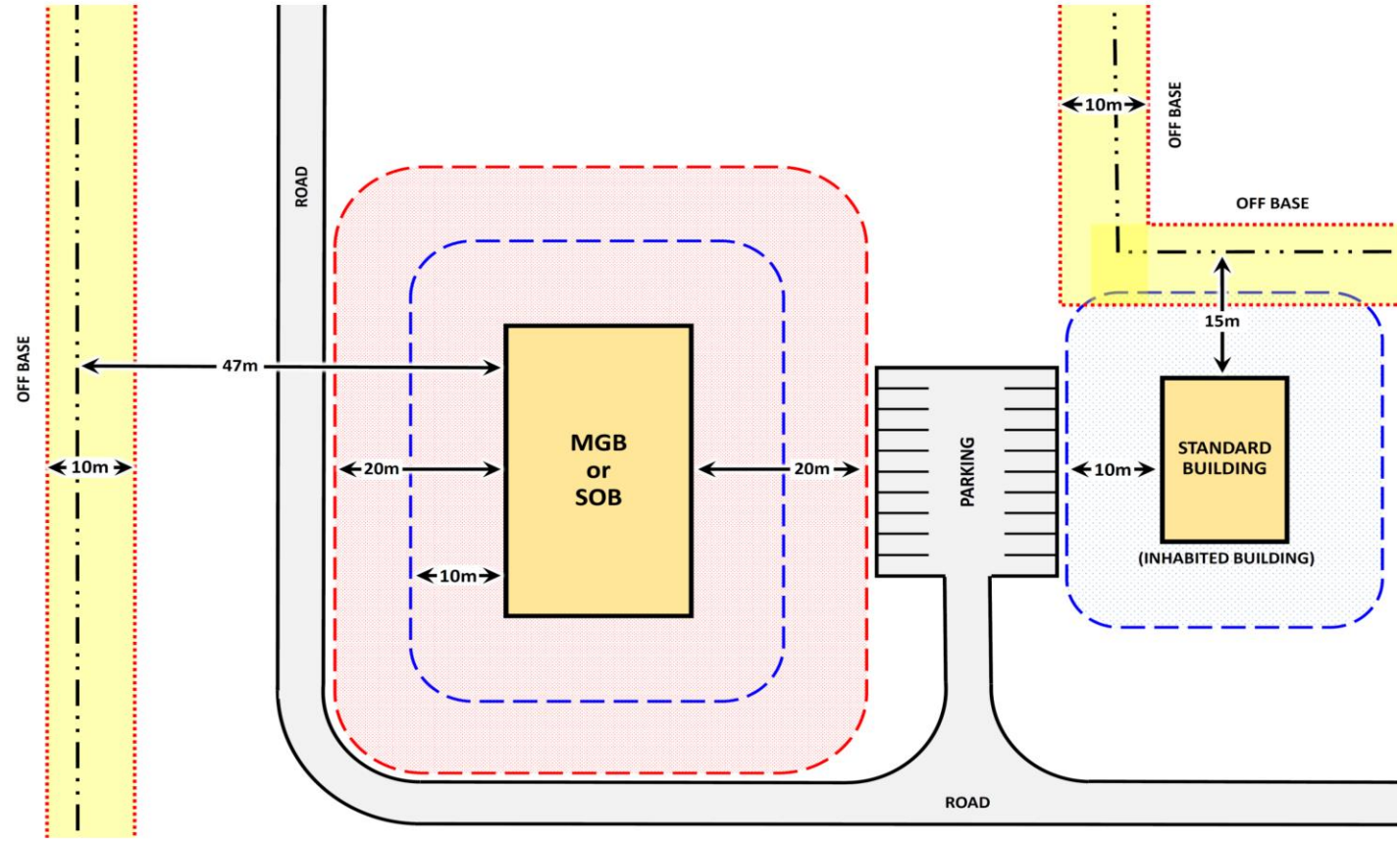
S.E. LISZEWSKI

DISTRIBUTION: MCIPAC-MCBB List B

Table 1-1, Supplemental AT Standoff Distances

TYPE OF STRUCTURE	EXPLOSIVES WEIGHT ONE (DISTANCE FROM CAMP PERIMETER FENCE)	EXPLOSIVES WEIGHT TWO (DISTANCE FROM ON BASE ROADS AND PARKING
MASS GATHERING BUILDING (LOW LOP)	47 meters	20 meters
SIGNIFICANT OCCUPANCY BUILDING (LOW LOP)	47 meters	20 meters
STANDARD BUILDING (INHABITED BUILDING – VERY LOW LOP)	15 meters	Not applicable; 10 meter Unobstructed Space

AT Standoff Distance is based on the USINDOPACOM Design Basis Threat (DBT) as designated in USPACOM Instruction 0536.2, paragraph 9.8 (Design Basis Threat), subparagraph c. The USINDOPACOM DBT is applied against buildings equipped with laminated windows that are no less than 6 millimeter nominal polycarbonate or laminated glass. The 6 millimeter laminated glass consists of two nominal 3 millimeter glass panes bonded together with a minimum of a 0.75 millimeter polyvinyl-butyral (PVB) interlayer in accordance with paragraph 3-11 AT Standard 10 (Glazing) and paragraph 3-13 Standard 12 (Exterior Doors), Chapter 3 (Standards), UFC 4-010-01.



US Army Corps of Engineers®

PDC-TR 12-08 - Rev 3
22 February 2018

PROTECTIVE DESIGN CENTER
TECHNICAL REPORT

STANDOFF DISTANCES FOR JAPANESE CONVENTIONAL CONSTRUCTION

Prepared for
U.S. Army Corps of Engineers
Japan Engineer District

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FOREWORD

The Government of Japan (GOJ) funds construction of certain U.S. Department of Defense (DoD) buildings in Japan. When these DoD buildings are inhabited, the requirements of UFC 4-010-01[1] are mandatory. Meeting the UFC 4-010-01 requirement significantly impacts the standoff distances (separation from the building to parking, roadways, and installation perimeter) required, construction, and fenestration.

While UFC 4-010-01 and PDC-TR 10-01[2] provide information on conventional construction, i.e., construction that would be used in the absence of the UFC 4-010-01 requirements, the construction is more representative of that in the contiguous United States (CONUS). The differences between CONUS conventional construction and conventional construction in Japan can lead to challenges in ensuring that the requirements of UFC 4-010-01 are effectively and efficiently satisfied.

The U.S. Army Corps of Engineers (USACE) Japan Engineer District (JED) requested that USACE Protective Design Center (PDC) provide information specific to typical construction used for DoD building in Japan as it relates to meeting the requirements of UFC 4-010-01. Typical construction of DoD buildings in Japan uses reinforced concrete structural components and laminated glass windows.

This is a new document that supersedes PDC-TR 07-02[3]in its entirety. As with the original document, and subsequent revisions, this revision provides required minimum standoff distances for construction and windows typically used in Japan, which will achieve the protection requirements from UFC 4-010-01. Revisions have been driven by changes in criteria, changes in typical construction used in Japan, and improvements to analytical tools.

For this report, the JED provided a matrix of twenty four windows sizes and nine glazing layups. The PDC determined the standoff distance required to achieve low and very low, levels of protection (LOP) as defined in UFC 4-010-01 for both Explosive Weights I and II as defined in UFC 4-010-02[4]. The PDC also determined standoff distances required for a low and Very Low LOP, for both Explosive Weights I and II, for a revised matrix of reinforced concrete structural components identified by JED as commonly used in Japan.

The information provided will assist in determining if the protection requirements of UFC 4-010-01 are being provided in an effective and efficient manner. Facilities of different construction and facilities that must provide protection from threats greater than those in UFC 4-010-01 must be specifically analyzed.

[1] Unified Facility Criteria (UFC) 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings,* 1 October 2013, http://dod.wbdg.org/
[2] Protective Design Center Technical Report (PDC-TR) 10-01, *Conventional Construction Standoff Distances of the Low and Very Low Levels of Protection IAW UFC 4-010-01*, https://pdc.usace.army.mil/
[3] Protective Design Center Technical Report (PDC-TR) 07-02, *Standoff Distances for Standard Facilities Constructed in Japan*, https://pdc.usace.army.mil/
[4] Unified Facility Criteria (UFC) 4-010-02, *DoD Minimum Antiterrorism Standoff Distances For Buildings*, , 1 October 2013, http://dod.wbdg.org/

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CONTENTS

TABLES

FIGURES

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SECTION 1 – INTRODUCTION

1-1 Background

The Government of Japan (GOJ) funds construction of certain U.S. Department of Defense (DoD) buildings in Japan. When these DoD buildings are inhabited, the requirements of UFC 4-010-01 are mandatory. Meeting the UFC 4-010-01 requirements significantly impacts the standoff distances (separation from the building to parking, roadways, and installation perimeter) required, construction, and fenestration.

While UFC 4-010-01 and PDC-TR 10-01 provide information on conventional construction, i.e., construction that would be used in the absence of the UFC 4-010-01 requirements, the construction is more representative of that in the contiguous United States (CONUS). The differences between CONUS conventional construction and conventional construction in Japan can lead to challenges in ensuring that the requirements of UFC 4-010-01 are effectively and efficiently satisfied.

The U.S. Army Corps of Engineers (USACE) Japan Engineer District (JED) requested that USACE Protective Design Center (PDC) provide information specific to typical construction used for DoD building in Japan as it relates to meeting the requirements of UFC 4-010-01. Typical construction of DoD buildings in Japan uses reinforced concrete structural components and laminated glass windows.

1-2 Purpose and Scope

This is a new document that supersedes PDC-TR 07-02 in its entirety. As with the original document, and subsequent revisions, this report provides required standoff distances for protection requirements from UFC 4-010-01 for construction and windows typically used in Japan. Revisions have been driven by changes in criteria, changes in typical construction used in Japan, and improvements to analytical tools.

For this revision, the JED provided a matrix of twenty-four windows sizes and nine glazing layups. The PDC determined the standoff distance required to achieve a Low and Very Low Level of Protection (LOP) as defined in UFC 4-010-01 for both Explosive Weights I and II as defined in UFC 4-010-02. The PDC also determined standoff distances required for a low and Very Low LOP, for both Explosive Weights I and II, for a revised matrix of reinforced concrete structural components commonly used in Japan as identified by JED.

Section 2 of this document provides information on the required standoff distances for structural components. Section 3 provides information on the required standoff distances for fenestration. The information provided will assist in determining if the protection requirements of UFC 4-010-01 are being provided in an effective and efficient manner.

This report does not address any requirements related to conventional loads (e.g., seismic, wind, live, dead). The adequacy of structural components and windows to resist these loads is the responsibility of the Engineer of Record for the design.

1-3 Applicability

The information in this report is for use with facilities required to meet the UFC 4-010-01 requirements and whose windows and construction fall within the limits of those detailed in this report. Facilities of different construction and facilities that must provide protection from threats greater than those in UFC 4-010-01 must be analyzed for the construction provided and/or the identified threats. This report is a tool for engineers and architects with experience and knowledge of antiterrorism standards and blast effects. It should not be used without complete understanding of its results and limitations.

1-4 References

The following references are cited in this report by designation only.

- ASTM Standard E1300, *Standard Practice for Determining Load Resistance of Glass in Buildings,* 2016, http://www.astm.org/
- ASTM Standard F1642, *Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings,* 2016, http://www.astm.org/
- ASTM Standard F2912, *Standard Specification for Glazing and Glazing Systems Subject to Airblast Loadings,* 2017, http://www.astm.org/
- ASTM Standard F2247, *Standard Test Method for Metal Doors Used in Blast Resistant Applications,* 2011, http://www.astm.org/
- ASTM Standard F2248, *Standard Practice for Specifying an Equivalent 3-Second Duration Design Loading for Blast Resistant Glazing Fabricated with Laminated Glass,* 2012, http://www.astm.org/
- Glass Association of North America (GANA) Glazing Manual, 2011, http://www.glasswebsite.com/
- Protective Design Center Technical Report (PDC-TR) 10-01, *Conventional Construction Standoff Distances of the Low and Very Low Levels of Protection IAW UFC 4-010-01*, https://pdc.usace.army.mil/
- Protective Design Center Technical Report (PDC-TR) 06-08, Rev. 1, *Single Degree of Freedom Structural Response Limits for Antiterrorism Design*, https://pdc.usace.army.mil/
- Protective Design Center Technical Report (PDC-TR) 07-02, *Standoff Distances for Standard Japan Facilities Improvement Program Construction (Structures and Windows)*, https://pdc.usace.army.mil/
- Protective Design Center Technical Report (PDC-TR) 06-01, *Methodology Manual for the Single-Degree-of-Freedom Blast Effects Design Spreadsheets (SBEDS)*, https://pdc.usace.army.mil/
- Protective Design Center Technical Report (PDC-TR) 12-01, *Methodology Manual for the SBEDS-W Window Analysis Spreadsheet*, 2014, https://pdc.usace.army.mil/
- *Single-Degree-of-Freedom Blast Effects Design Spreadsheets (SBEDS) version 4.2*, USACE Protective Design Center https://pdc.usace.army.mil/
- *Single-Degree-of-Freedom Blast Effects Design Spreadsheets – Windows (SBEDS-W) version 1.0*, USACE Protective Design Center https://pdc.usace.army.mil/

- Unified Facility Criteria (UFC) 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings,* 1 October 2013, http://dod.wbdg.org/
- Unified Facility Criteria (UFC) 4-010-02, *DoD Minimum Antiterrorism Standoff Distances For Buildings,* 1 October 2013, https://pdc.usace.army.mil/
- Unified Facility Criteria (UFC) 4-020-01, *DoD Security Engineering Facilities Planning Manual,* 11 September 2008, http://dod.wbdg.org/
- Unified Facilities Guide Specifications (UFGS) 08 51 13, *Aluminum Windows,* 1 May 2011, http://dod.wbdg.org/

1-5 Relationship to Other Requirements

This document is intended to supersede only PDC-TR 07-02 and is not intended to supersede, nor lessen, any other requirements. In the case of conflicts between this PDC-TR and other applicable criteria, the more stringent requirement shall control.

1-6 Conventional Explosive Effects Considered

Detonation of a conventional explosive device results in a release of energy that occurs so rapidly that there is a local accumulation of energy at the site of the explosion. The accumulated energy dissipates violently through blast waves, propulsion of fragments, and thermal radiation. Depending on the configuration and location of the device, the released energy may cause a pressure wave in air (airblast), groundshock, fragmentation, cratering, thermal radiation, or any combination of these effects.

For terrorist conventional explosive devices considered in UFC 4-010-01, airblast is the primary effect considered in design of structures. The required standoff distances presented in this report are based on airblast requirements.

1-7 Determining Applicable Level of Protection and Explosive Weight

All buildings meeting the definition in UFC 4-010-01 for ‘inhabited building’ require at a minimum a Very Low LOP. Buildings meeting the definition in UFC 4-010-01 for ‘billeting’, ‘high occupancy family housing’, or ‘primary gathering buildings’ require a Low LOP. Descriptions of the expected damage associated with these LOP are found in Table 2-1 and Table 2-2 of UFC 4-010-01.

The applicable Explosive Weight to use is dependent on whether the installation has a controlled perimeter as defined in UFC 4-010-01. Explosive Weight I, as defined in UFC 4-010-02, is associated with charges detonated at a controlled perimeter. Explosive Weight II, as defined in UFC 4-010-02, is associated with charges detonated in parking areas and roadways if the installation has a controlled perimeter. If an installation lacks a controlled perimeter, detonation of Explosive Weight I should be considered in parking areas and roadways. Unobstructed space, as defined in UFC 4-010-01, extends to the parking, roadways, and trash containers.

1-8 Changes in Revision 3

Revision 3 adds ranges of geometry and reinforcing to the structural components, adds glazing layups, changes the window geometries, defines unobstructed space, clarifies load bearing components, defines the maximum anchor spacing, removes the in-plane load discussion, and non-conforming window procedure.

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SECTION 2 – STRUCTURAL COMPONENTS

2-1 General

The PDC examined the typical structural components identified by JED to determine minimum required standoff distance for structural components. Standoff distances for Low and Very Low LOP, for both Explosive Weights I and II, are determined as discussed below.

2-2 Components Examined

The components shown in Table 1 were identified by JED as typical construction for DoD facilities in Japan.

As specified by JED, for all components:

- 21 MPa was used for static compressive strength of concrete.
- 295 MPa was used for reinforcing static yield strength.
- 440 MPa was used for reinforcing static ultimate strength.

Table 1 – Structural Components Considered (Reinforced Concrete)

Component	Sections (mm)	Spans (m)	Reinforcing Ratio or Reinforcing	Support Condition
Column	600 x 600 700 x 700 800 x 800	3.5 - 6[1]	0.006 - 0.019	Fixed - Simple Fixed - Fixed
Girder	350 x 950 400 x 1400	8 - 12	0.006 – 0.020	Fixed - Fixed
Roof Beam	350 x 650 450 x 900	4.5 - 6.5	0.004 – 0.017	Fixed - Fixed
Wall[1]	150 to 200	3.4 - 10	D10, 150 mm each way in middle of wall	One and two way, all fixed or simple
Roof Slab	130 to 200	3 - 3.5	D10, 200 mm each way at top and bottom of slab	Fixed - Fixed

1 - Clear height of the column
2 - Walls are assumed to be between the range of nonload-bearing (2,919 N/m of vertical load, not including the weight of wall) as defined by the 2015 International Building Code and supporting a vertical load of 29,190 N/m.

2-3 Methodology

To determine the required minimum standoff distance, information contained in previous versions of PDC-TR 07-02 and PDC-TR 10-01 were first investigated. The required standoff distance for many of the components identified in Table 1 could be found in these two documents. For components not contained in these documents, SBEDS v4.2 and PDC-TR 06-08 were used to determine the required standoff distances to achieve the required LOP. The component response due to airblast loads was determined using SBEDS and the response limits from PDC-TR 06-08 were used to determine the expected LOP. PDC-TR 06-01 recommended increase factors for average strength and dynamic effects were applied to the static strengths identified by JED. Any components not falling with in the dimensions specified in Table 1 should be analyzed dynamically to determine the component adequacy.

2-4 Results and Conclusions

Table 2 contains the required minimum standoff distances for Low LOP and Very Low LOP, for both Explosive Weights I and II, for reinforced concrete structural components common for DoD facilities in Japan (see Table 1). The values presented in Table 2 are based on review of previous versions of PDC-TR 07-02, PDC-TR 10-01, and SBEDS analyses of components not found in these two documents.

The distances given in Table 2 assume fully reflected blast loading. If the pressure is not fully reflected, analysis may show lesser standoff required because side-on pressures will usually dominate the response instead of reflected pressures. However, in no case use standoffs less than the minimum standoffs specified in UFC 4-010-01.

Table 2 - Required Minimum Standoff Distances for Structural Components*

Explosive Weight	Required Minimum Standoff Distance (m)	
	Low LOP	Very Low LOP
I	8	6
II	4	4

* - distance given assume fully reflected loading (i.e., a line of sight exists from the charge to the component.)

Before applying the standoff distance in Table 2, verify that the structural components are commensurate with those in Table 1 and that the required minimum standoff for windows (see Section 3) is not greater than those in Table 2.

These minimum standoffs include only the wall, column, beam, and roof components. The controlling component of the standoff is generally the doors and windows. These components are addressed in Section 3.

Facilities of different construction than identified in Table 1, facilities that must provide protection from an identified threat or facilities required to provide a higher LOP than those in UFC 4-010-01 must be specifically analyzed.

SECTION 3 – DOORS AND FENESTRATION

3-1 General

In this section, the alternate design strategy for exterior doors, or the interior doors in a vestibule or foyer type arrangement, is discussed along with the required minimum standoff distances for a matrix of window sizes and glazing layups.

3-2 Doors

See Appendix for the standards that apply to door layout and selection.

3-3 Windows

3-3.1 General

The JED specified nine glazing layups (see Table 3) and twenty-four window geometries (see Table 4) commonly used for DoD facilities in Japan. The windows have aluminum frames and mullions with a minimum yield strength of 110 MPa. For each of the geometries, the required minimum standoff distance for each of the glazing systems was investigated. As with the structural components, the required minimum standoff distances assume a fully reflected blast loading. The rough opening is the opening in the wall that the window system will be framed into.

The operable glazing systems provided by JED are rated for a Design Pressure (DP) of 3.6 kPa for Windows 6 to 12. Figure 1 includes definitions for glazing system components.

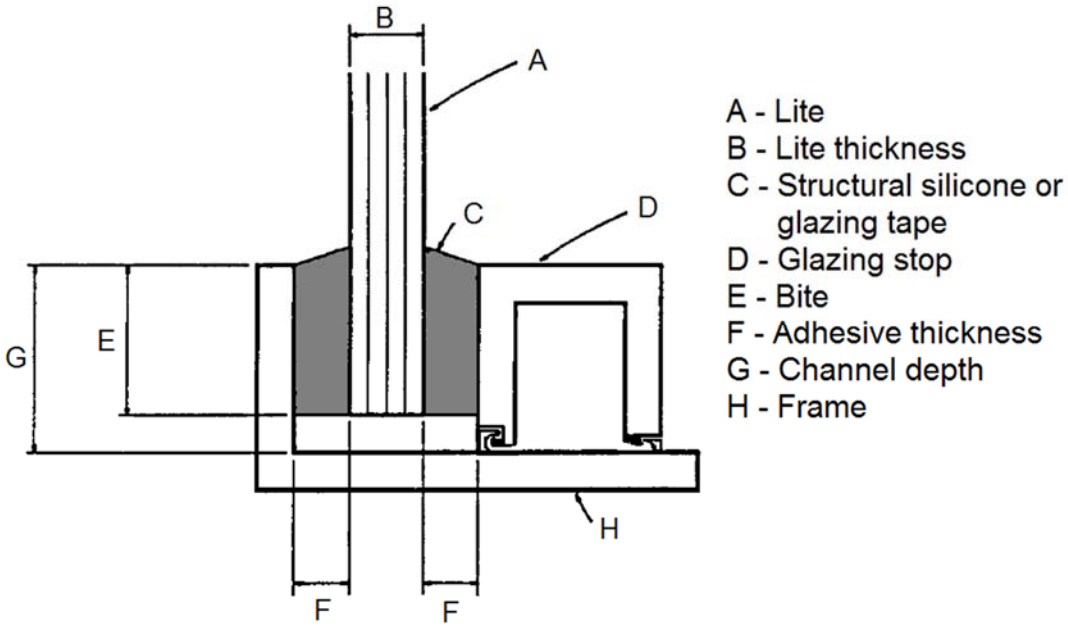


Figure 1 – Insulated Glazing Unit (IGU) Construction

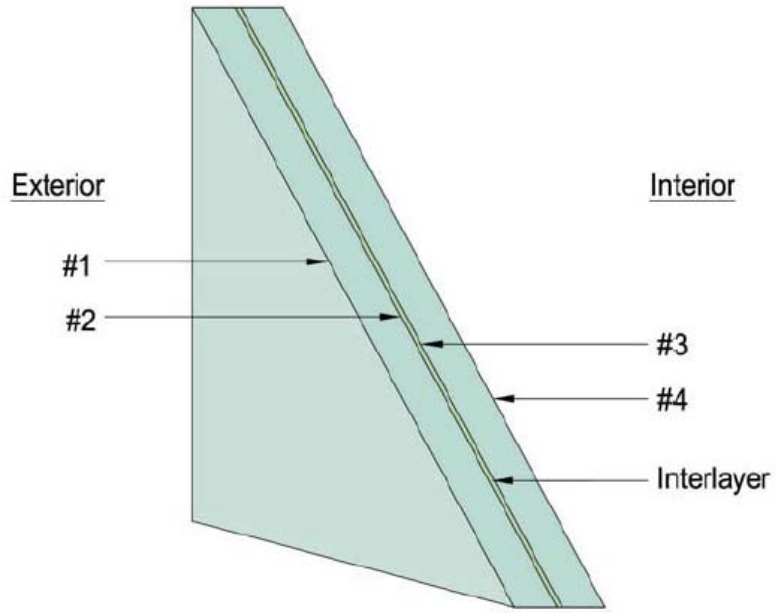


Figure 2 – Single Pane IGU (Numbers indicate glass edges)

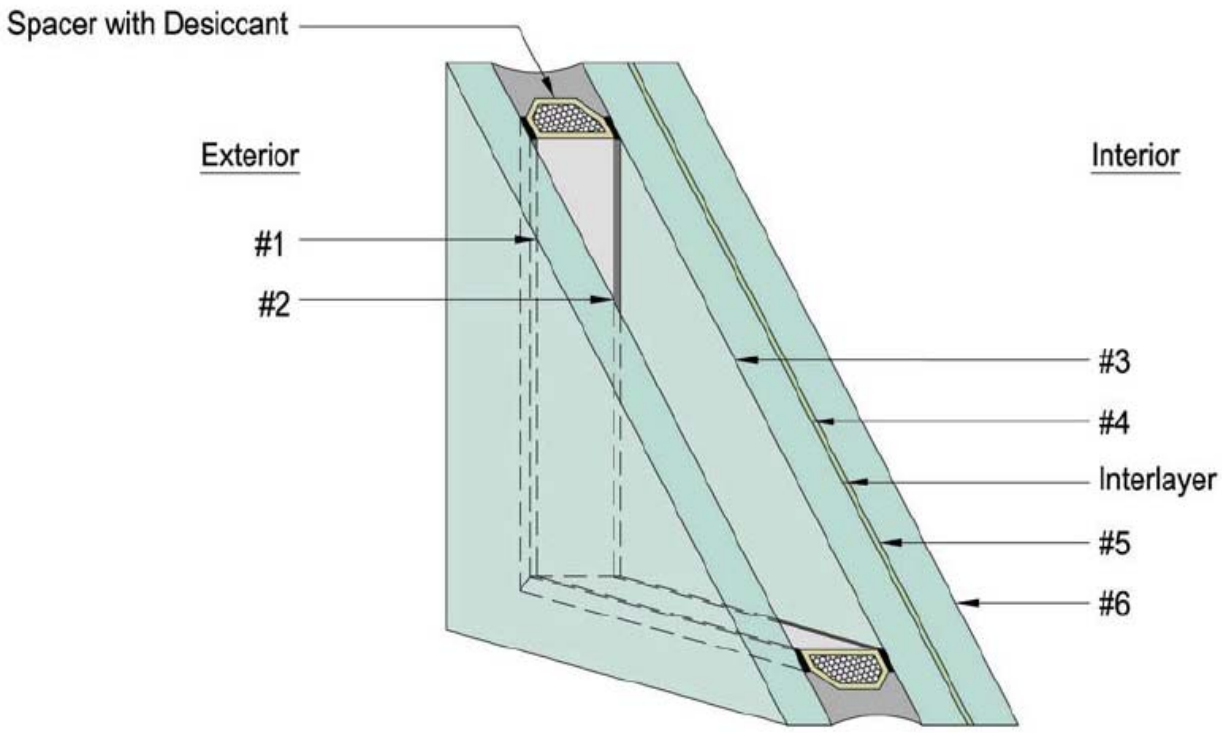


Figure 3 - Double Pane IGU (Numbers indicate glass edges)

Table 3 – Glazing Layups Considered

Layup Number	Layup[1]	Required Minimum Standoff	Silicone Tensile Strength[5] (MPa)
1	Single pane, 6-mm (0.76) laminate[2]	See Table 5	1
2	Single pane, 6-mm (1.52) laminate[2]	See Table 6	1.7
3	IGU[3], 3-mm monolithic + air gap[4] + 6-mm (0.76) laminate	See Table 7	1.7
4	IGU[3], 3-mm monolithic + air gap[4] + 6-mm (1.52) laminate	See Table 8	1.7
5	IGU[3], 5-mm monolithic + air gap[4] + 6-mm (0.76) laminate	See Table 9	1.7
6	IGU[3], 5-mm monolithic + air gap[4] + 6-mm (1.52) laminate	See Table 10	1.7
7	IGU[3], 5-mm monolithic + air gap[4] + 6-mm (2.28) laminate	See Table 11	1.7
8	IGU[3], 6-mm monolithic + air gap[4] + 6-mm (0.76) laminate	See Table 12	1.7
9	IGU[3], 6-mm monolithic + air gap[4] + 6-mm (1.52) laminate	See Table 13	1.7

1 - Number in parentheses is the PVB inner layer (24 MPa strength) thickness in mm for laminated pane.

2 - Glazing is anchored to the frame w/ structural silicon beads on all four edges, both faces.

3 - Insulated glazing unit (IGU) with a laminated pane on interior side of unit and anchored to frame with structural silicon bead on all four edges, interior face only.

4 - 6 and 12-mm air gaps were analyzed.

5 - Structural silicone bead minimum width is 9.5-mm and the minimum thickness is 5-mm.

Table 4 – Window Geometry

Window Number	Rough Opening		Number of Sashes	Sash Width[1] (m)	Height of Sill Above Floor (m)	Minimum Mullion Moment of Inertia (mm^4)	Frame Design Pressure (kPa)	Structural Test Pressure (kPa)	Static Reaction Load (kPa)
	Height (m)	Width (m)							
1	0.60	0.30	1	0.30	1.50	-[3]	-[3]	-[3]	-[3]
2	0.60	0.45	1	0.45	1.50	-[3]	-[3]	-[3]	-[3]
3	0.60	0.60	1	0.60	1.50	-[3]	-[3]	-[3]	-[3]
4	0.90	0.60	1	0.60	1.20	-[3]	-[3]	-[3]	-[3]
5	0.90	0.90	1	0.90	1.20	-[3]	-[3]	-[3]	-[3]
6	0.90	1.20	2	0.60	1.20	23,700	3.6	5.4	10.8
7	1.20	1.20	2	0.60	1.10	70,300	3.6	5.4	10.8
8	1.20	1.50	2	0.75	1.10	87,900	3.6	5.4	10.8
9	1.20	1.80	2	0.90	1.10	106,000	3.6	5.4	10.8
10	1.60	1.80	2	0.90	1.10	291,400	3.6	5.4	10.8
11	2.10	1.80	2	0.90	0.00	738,000	3.6	5.4	10.8
12	2.10	2.10	2	1.05	0.00	861,000	3.6	5.4	10.8
13	1.20	1.20	1	1.20	0.90	-[3]	-[3]	-[3]	-[3]
14	1.50	1.50	1	1.50	0.60	-[3]	-[3]	-[3]	-[3]
15	1.80	1.80	1	1.80	0.30	-[3]	-[3]	-[3]	-[3]
16-a	0.60	1.80	2	0.90	2.10	7,900	3.6	5.4	10.8
16-b	0.60	1.80	2	0.90	3.00	7,900	3.6	5.4	10.8
16-c	0.60	1.80	2	0.90	4.00	7,900	3.6	5.4	10.8
17-a	0.60	1.20	2	0.60	2.10	5,300	3.6	5.4	10.8
17-b	0.60	1.50	2	0.75	2.10	6,600	3.6	5.4	10.8
17-c	0.60	1.80	2	0.90	2.10	7,900	3.6	5.4	10.8
18-a	0.60	1.20	1	1.20	2.40	10,600	3.6	5.4	10.8
18-b	0.60	1.50	1	1.50	2.40	13,200	3.6	5.4	10.8
18-c	0.60	1.80	1	1.80	2.40	15,800	3.6	5.4	10.8

1 - Sash height equal to rough opening height.

2 – See Appendix A for window geometries drawings.

3 - Not applicable for single sash windows.

3-3.2 Methodology

UFC 4-010-01 allows both static and dynamic analyses of windows systems (i.e., glazing, framing members, and anchorage). To determine the minimum standoffs required for the Low LOP and Very Low LOP, a dynamic approach using the SBEDS-W software is used for the glazing. The default material properties from SBEDS-W, as described in PDC-TR 12-01, were used.

The correlation between levels of protection and the glazing hazard ratings from ASTM F2912-17 is given in Figure 4. Laminated windows have a tendency to fail suddenly when they disengage from the frame. As the standoff distance is reduced, a window may go from a Medium LOP to a Very Low LOP without an intermediate standoff that results in a Low LOP. For certain geometries and glazing layups, not having a standoff associated with Low LOP and Very Low LOP would not be unexpected. In the tables below, if a Low, or Very Low, LOP was not attainable, the standoff associated with a Medium LOP is reported. If a Medium LOP is reported for the lite (Note 3 in Tables 5-13), the window can be used at any sill height due to the glass remaining in the frame.

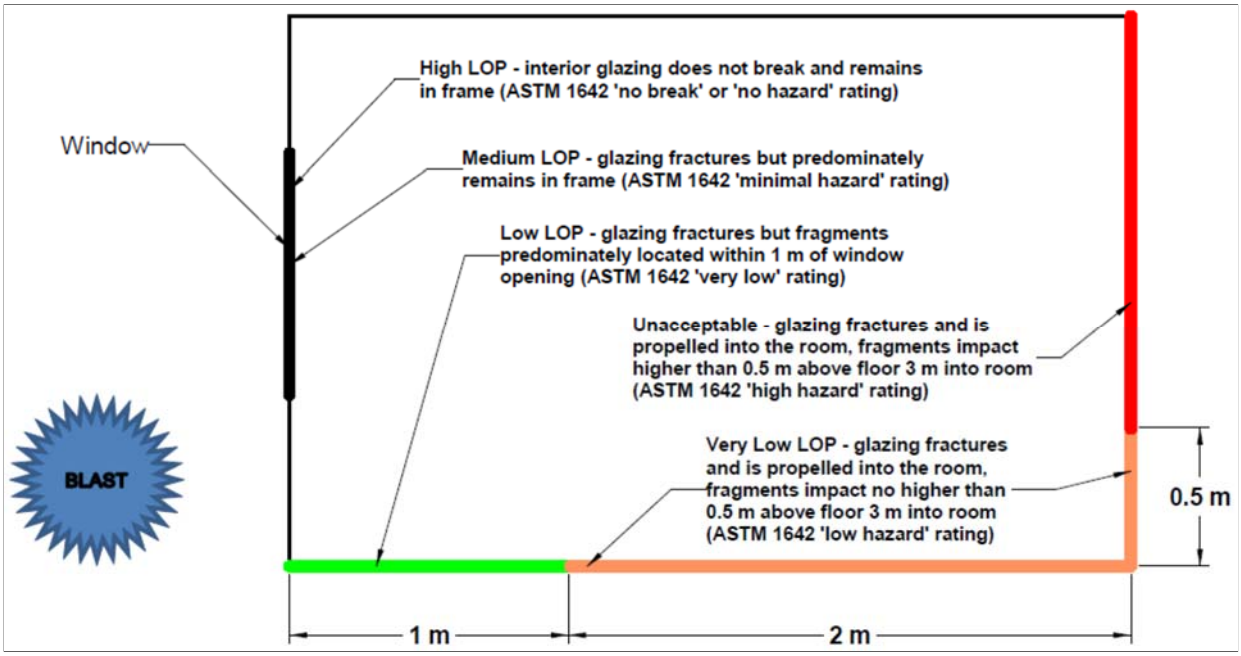


Figure 4 – Glazing LOP - Hazard Level Correlation

To analyze operable windows in SBEDS-W, a boundary condition requirement is that the frame seats in the opening formed by the mullions, so the supports can be assumed to be pinned. Both panes of the double sash operable windows and the frames, mullions and tracks of the windows specified by JED were assumed to be controlled by the low bearing capacity of the mullion. For Windows 6-12, a static procedure based on ASTM F2248 was used to determine the applicable standoff. The procedure is described in detail later in this section. Dynamic analyses were conducted on the double sash operable window lites assuming the frame would not fail. The mullions were calculated to have higher required standoff distances than the lites. Therefore, the lites would not control the standoff for the glazing system and the frame standoffs were used.

The design of the window frame members, connection of the frame members to the supporting structural elements (SSE) and the SSE are dependent on the static equivalent out-of-plane window reactions. The out-of-plane reaction is an equivalent static reaction load equal to the maximum window resistance multiplied by the window area and divided by the total supported length connected to the SSE along the window perimeter and is determined using SBEDS-W or Equation 5 shown in Appendix B The maximum resistance for the dynamic analysis is based on the largest of the maximum resistance from the glass response or the post break membrane response based on analysis using SBEDS-W. The maximum resistance for the static analysis was based on a rated Design Pressure (DP) in accordance with UFGS 08 51 13 and the static procedure described below.

The design pressures were multiplied by a factor of 1.5 to determine the Structural Test Pressure (STP) in accordance with UFGS 08 51 13 and AAMA/WDMA/CSA 101/I.S.2/A4411. The STP was considered equal to the load resistance (LR) of the window system and ASTM F2248 was used to find the corresponding standoffs. The STP was multiplied by a factor of 2 to determine the out-of-plane reaction, according to ASTM F2248. The minimum moments of inertia of the mullions shown in Table 4 satisfy the required L/60 deflection criteria. Since the frame is also subject to 150% of the design load and must remain operable, the extra capacity can be used to reduce the standoff of the operable windows. Twice the structural load should be used to design the connection to the supporting structural elements as a safety factor from the conversion from a static pressure to a dynamic pressure. The ASTM procedure provides a Medium LOP but can be conservatively used for Very Low LOP and Low LOP buildings as well.

When mullions are provided with DPs other than 3.6 kPa for Windows 6 through 12 and 16 through 18, use the equations shown in Appendix B to determine the corresponding standoff, out-of-plane reactions. Also, verify that the mullion will meet the L/60 deflection criteria when loaded with 2 times the STP.

The maximum anchor spacing was assumed to be 400 mm. This spacing will allow the use of any frame member due to the small span between the anchors. Also, an additional anchor should be placed at the top and bottom of each mullion to support the concentrated load.

ASTM F2248 was used to determine the required silicone geometry. This practice sets the depth of the structural silicone sealant bead to be at least equal to the larger of approximately 9.5mm or the thickness designation of the glass to which it adheres but not larger than two times the thickness designation of the glass to which it adheres. The minimum thickness of the structural silicone bead shall be 5mm.

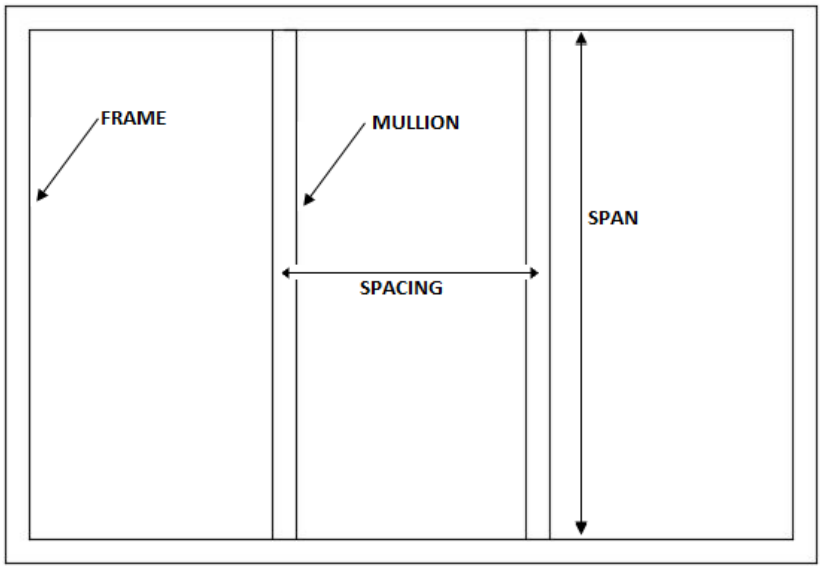


Figure 5 – Window Definitions

3-3.3 Results

The minimum required standoff distances and out-of-plane reactions are contained in Table 5 through Table 13. Each table is for one of the nine glazing layups shown in Table 3 and addresses all twenty four of the window geometries shown in Table 4.

Table 5 – Single Pane Glazing Layup 1[1]

Window Number[2]	Level of Protection	Explosive Weight I		Explosive Weight II	
		Required Standoff (m)	Out-of-Plane Reaction (N/mm)	Required Standoff (m)	Out-of-Plane Reaction (N/mm)
1	Low	32[3]	6.4	17[3]	6.5
	Very Low	30	6.4	15	6.7
2	Low	31[3]	8.0	16[3]	7.8
	Very Low	30	8.2	15	8.1
3	Low	26[3]	12.6	13[3]	12.9
	Very Low	25	13.1	-[4]	-[4]
4	Low	38[3]	7.1	18[3]	7.2
	Very Low	35	7.3	17	7.3
5	Low	30[3]	12.5	14[3]	12.8
	Very Low	28	13.0	-[4]	-[4]
6	Low	38[3]	7.1	18[3]	7.2
	Very Low	35	7.3	16	7.3
7	Low	42[3]	6.3	20[3]	6.1
	Very Low	37	6.3	17	6.3
8	Low	41	7.0	20[3]	6.5
	Very Low	37	7.0	-[4]	-[4]
9	Low	39	8.2	18[3]	8.0
	Very Low	36	8.2	17	8.2
10	Low	45	6.6	20[3]	6.5
	Very Low	41	6.6	18	6.6
11	Low	46	6.1	20	6.1
	Very Low	33	6.1	15	6.1
12	Low	47	6.3	20[3]	6.1
	Very Low	36	6.3	15	6.3
13	Low	32[3]	12.8	15[3]	12.3
	Very Low	30	13.1	14	13.1
14	Low	33[3]	13.0	15[3]	12.5
	Very Low	31	13.1	14	13.1
15	Low	34[3]	13.0	15[3]	12.6
	Very Low	32	13.1	14	13.1
16-a	Low	38[3]	7.1	18[3]	7.2
	Very Low	36	7.3	17	7.3
16-b	Low	38[3]	7.1	18[3]	7.2
	Very Low	36	7.3	17	7.3
16-c	Low	38[3]	7.1	18[3]	7.2
	Very Low	37	7.3	-[4]	-[4]

Table 5 – Single Pane Glazing Layup 1[1] (cont.)

Window Number[2]	Level of Protection	Explosive Weight I		Explosive Weight II	
		Required Standoff (m)	Out-of-Plane Reaction (N/mm)	Required Standoff (m)	Out-of-Plane Reaction (N/mm)
17-a	Low	29[5]	2.2	13[5]	2.2
	Very Low	-[4]	-[4]	-[4]	-[4]
17-b	Low	33[3]	8.7	16[3]	8.8
	Very Low	32	8.8	-[4]	-[4]
17-c	Low	38[3]	7.1	18[3]	7.2
	Very Low	36	7.3	17	7.3
18-a	Low	42[3]	6.3	20[3]	6.1
	Very Low	39	6.3	18	6.3
18-b	Low	45[3]	6.0	21[3]	5.9
	Very Low	41	6.1	19	6.1
18-c	Low	46	6.0	21	6.0
	Very Low	43	6.0	20	6.0

1 - See Table 3 for glazing layup description.

2 - See Table 4 for window geometry.

3 - Glazing provides MEDIUM LOP

4 - Level of Protection values overlap, only the highest LOP is shown.

5 - Standoff controlled by operable frame and meets MEDIUM LOP per paragraph 3-3.2.

Table 6 – Single Pane Glazing Layup 2[1]

Window Number[2]	Level of Protection	Explosive Weight I		Explosive Weight II	
		Required Standoff (m)	Out-of-Plane Reaction (N/mm)	Required Standoff (m)	Out-of-Plane Reaction (N/mm)
1	Low	23[3]	11.8	12[3]	12.4
	Very Low	-[4]	-[4]	-[4]	-[4]
2	Low	22[3]	15.8	12[3]	14.9
	Very Low	-[4]	-[4]	11	16.3
3	Low	19[3]	24.2	10[3]	24.1
	Very Low	-[4]	-[4]	-[4]	-[4]
4	Low	26[3]	14.4	13[3]	14.4
	Very Low	-[4]	-[4]	-[4]	-[4]
5	Low	21[3]	25.2	11[3]	23.4
	Very Low	-[4]	-[4]	10	26.1
6	Low	29[5]	2.8	13[5]	2.8
	Very Low	-[4]	-[4]	-[4]	-[4]
7	Low	29[5]	12.6	15[3]	11.6
	Very Low	-[4]	-[4]	14	12.6
8	Low	29[5]	13.8	13[5]	13.6
	Very Low	-[4]	-[4]	-[4]	-[4]
9	Low	29[5]	3.9	13[5]	3.9
	Very Low	-[4]	-[4]	-[4]	-[4]
10	Low	32[3]	13.0	15[3]	12.6
	Very Low	30	13.1	14	13.1
11	Low	33	12.2	15[3]	11.7
	Very Low	29	12.2	13	12.2
12	Low	33[3]	12.5	15	12.6
	Very Low	29	12.6	13	12.6
13	Low	23[3]	24.8	11[3]	24.5
	Very Low	22	26.1	-[4]	-[4]
14	Low	24[3]	25.2	11[3]	25.0
	Very Low	23	26.1	-[4]	-[4]
15	Low	25[3]	25.0	11[3]	25.1
	Very Low	24	26.1	-[4]	-[4]
16-a	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]
16-b	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]
16-c	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]

Table 6 – Single Pane Glazing Layup 2[1] (cont.)

Window Number[2]	Level of Protection	Explosive Weight I		Explosive Weight II	
		Required Standoff (m)	Out-of-Plane Reaction (N/mm)	Required Standoff (m)	Out-of-Plane Reaction (N/mm)
17-a	Low	29[5]	2.2	13[5]	2.2
	Very Low	-[4]	-[4]	-[4]	-[4]
17-b	Low	29[5]	2.3	13[5]	2.3
	Very Low	-[4]	-[4]	-[4]	-[4]
17-c	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]
18-a	Low	29[5]	12.6	15[3]	11.6
	Very Low	-[4]	-[4]	14	12.6
18-b	Low	31[3]	12.0	15[3]	12.0
	Very Low	30	12.1	-[4]	-[4]
18-c	Low	32[3]	11.9	16[3]	11.4
	Very Low	31	12.1	15	12.1

1 - See Table 3 for glazing layup description.

2 - See Table 4 for window geometry.

3 - Glazing provides MEDIUM LOP

4 - Level of Protection values overlap, only the highest LOP is shown.

5 - Standoff controlled by operable frame and meets MEDIUM LOP per paragraph 3-3.2.

Table 7 – IGU Glazing Layup 3[1]

Window Number[2]	Level of Protection	Explosive Weight I		Explosive Weight II	
		Required Standoff (m)	Out-of-Plane Reaction (N/mm)	Required Standoff (m)	Out-of-Plane Reaction (N/mm)
1	Low	29[3]	8.7	15[3]	8.3
	Very Low	-[4]	-[4]	14	8.3
2	Low	29[3],[6]	8.0	14	7.8
	Very Low	28[6]	8.2	-[4]	-[4]
3	Low	26[3],[6]	12.3	12[3]	12.1
	Very Low	24[6]	13.0	-[4]	-[4]
4	Low	34[6]	7.3	16[3]	16.7
	Very Low	32[6]	7.3	14	7.3
5	Low	27[3]	12.7	13[3]	12.1
	Very Low	26	13.1	12	13.1
6	Low	34[3]	7.3	16[3]	6.7
	Very Low	32[6]	7.3	14	7.3
7	Low	37[3]	6.3	17[3]	6.0
	Very Low	33	6.3	15	6.3
8	Low	36[3]	6.8	17[3]	6.5
	Very Low	33	7.0	15	7.0
9	Low	35[3]	8.0	16[3],[6]	7.8
	Very Low	32	8.2	15	8.2
10	Low	41[3]	6.5	17[3]	6.4
	Very Low	35	6.6	15	6.6
11	Low	40	6.1	20[7]	6.1
	Very Low	32	6.1	15[7]	6.1
12	Low	47[7]	6.3	21[7]	6.1
	Very Low	36[7]	6.3	20[7]	6.3
13	Low	29[3]	12.7	13[3],[7]	12.7
	Very Low	28	13.1	-[4]	-[4]
14	Low	33[3],[7]	13.0	15[3],[7]	12.5
	Very Low	31[7]	13.1	14[7]	13.1
15	Low	34[3],[7]	13.0	15[3],[7]	12.6
	Very Low	32[6],[7]	13.1	14[7]	13.1
16-a	Low	34[3]	7.1	16[3]	6.7
	Very Low	33[6]	7.3	15	7.3
16-b	Low	34[3]	7.1	16[3]	6.7
	Very Low	33[6]	7.3	15	7.3
16-c	Low	34[3],[6]	7.1	16[3]	6.7
	Very Low	-[4]	-[4]	15	7.3

Table 7 – IGU Glazing Layup 3[1] (cont.)

Window Number[2]	Level of Protection	Explosive Weight I		Explosive Weight II	
		Required Standoff (m)	Out-of-Plane Reaction (N/mm)	Required Standoff (m)	Out-of-Plane Reaction (N/mm)
17-a	Low	29[5]	2.2	13[5]	2.2
	Very Low	-[4]	-[4]	-[4]	-[4]
17-b	Low	32[3]	8.7	14[3]	8.6
	Very Low	31[6]	8.8	-[4]	-[4]
17-c	Low	34[3]	7.1	16	6.7
	Very Low	33	7.3	15	7.3
18-a	Low	37[3],[6]	6.3	17[3]	6.0
	Very Low	34	6.3	16[3]	6.3
18-b	Low	39[3]	6.0	18[3]	5.8
	Very Low	35	6.1	16	6.1
18-c	Low	41	6.0	18[3]	5.9
	Very Low	36	6.0	16	6.0

1 - See Table 3 for glazing layup description.

2 - See Table 4 for window geometry.

3 - Glazing provides MEDIUM LOP

4 - Level of Protection values overlap, only the highest LOP is shown.

5 - Standoff controlled by operable frame and meets MEDIUM LOP per paragraph 3-3.2.

6 - Standoff controlled by 12 mm airgap

Table 8 – IGU Glazing Layup 4[1]

Window Number[2]	Level of Protection	Explosive Weight I		Explosive Weight II	
		Required Standoff (m)	Out-of-Plane Reaction (N/mm)	Required Standoff (m)	Out-of-Plane Reaction (N/mm)
1	Low	23[3],[6]	12.4	13[3],[6]	11.5
	Very Low	-[4]	-[4]	12[6]	12.5
2	Low	21[3],[6]	16.0	11[3]	14.3
	Very Low	-[4]	-[4]	-[4]	-[4]
3	Low	18[3],[6]	24.3	10[3],[6]	20.9
	Very Low	-[4]	-[4]	-[4]	-[4]
4	Low	24[3]	14.3	12[3]	13.6
	Very Low	23	14.6	11[3]	14.6
5	Low	21[3],[6]	21.7	10[3]	23.2
	Very Low	-[4]	-[4]	9[3]	26.1
6	Low	29[5]	2.8	13[5]	2.8
	Very Low	-[4]	-[4]	-[4]	-[4]
7	Low	29[5]	3.2	13[5]	3.2
	Very Low	-[4]	-[4]	-[4]	-[4]
8	Low	29[5]	3.6	13[5]	3.6
	Very Low	-[4]	-[4]	-[4]	-[4]
9	Low	29[5]	3.9	13[5]	3.9
	Very Low	-[4]	-[4]	-[4]	-[4]
10	Low	29[3]	12.8	13[5]	4.6
	Very Low	-[4]	-[4]	-[4]	-[4]
11	Low	31[3]	12.1	15[3],[7]	11.7
	Very Low	29[5]	5.2	13[7]	12.2
12	Low	35[3],[7]	12.5	15	12.6
	Very Low	29[7]	12.6	13[5],[7]	12.6
13	Low	21[3]	26.0	10[3],[7]	24.7
	Very Low	-[4]	-[4]	-[4]	-[4]
14	Low	24[3],[7]	25.2	11[3],[7]	25.0
	Very Low	23[7]	26.1	-[4]	-[4]
15	Low	25[3],[7]	25.0	11[3],[7]	25.1
	Very Low	24[7]	26.1	-[4]	-[4]
16-a	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]
16-b	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]
16-c	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]

Table 8 – IGU Glazing Layup 4[1] (cont.)

Window Number[2]	Level of Protection	Explosive Weight I		Explosive Weight II	
		Required Standoff (m)	Out-of-Plane Reaction (N/mm)	Required Standoff (m)	Out-of-Plane Reaction (N/mm)
17-a	Low	29[5]	2.2	13[5]	2.2
	Very Low	-[4]	-[4]	-[4]	-[4]
17-b	Low	29[5]	2.3	13[5]	2.3
	Very Low	-[4]	-[4]	-[4]	-[4]
17-c	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]
18-a	Low	29[5]	2.2	13[5]	2.2
	Very Low	-[4]	-[4]	-[4]	-[4]
18-b	Low	29[5]	2.3	14[3]	11.0
	Very Low	-[4]	-[4]	-[4]	-[4]
18-c	Low	29[3]	11.9	14[3]	11.2
	Very Low	-[4]	-[4]	-[4]	-[4]

1 - See Table 3 for glazing layup description.

2 - See Table 4 for window geometry.

3 - Glazing provides MEDIUM LOP

4 - Level of Protection values overlap, only the highest LOP is shown.

5 - Standoff controlled by operable frame and meets MEDIUM LOP per paragraph 3-3.2.

6 - Standoff controlled by 12 mm airgap

7 - Analysis only considers the 6mm laminated inner pane due to software limitations

Table 9 – IGU Glazing Layup 5[1]

Window Number[2]	Level of Protection	Explosive Weight I		Explosive Weight II	
		Required Standoff (m)	Out-of-Plane Reaction (N/mm)	Required Standoff (m)	Out-of-Plane Reaction (N/mm)
1	Low	29[3]	6.5	15[3]	6.7
	Very Low	28	6.4	14	6.6
2	Low	28[3]	9.8	14[3]	9.8
	Very Low	-[4]	-[4]	-[4]	-[4]
3	Low	35[3,6]	7.1	15[3,6]	7.1
	Very Low	32[6]	7.3	-[4]	-[4]
4	Low	35[6]	7.1	15[3,6]	7.1
	Very Low	32[6]	7.3	-[4]	-[4]
5	Low	28[3,6]	12.5	12[3]	11.8
	Very Low	26[6]	13.1	11[6]	13.0
6	Low	35[3,6]	7.1	15[3,6]	7.1
	Very Low	32[6]	7.3	-[4]	-[4]
7	Low	37[6]	6.3	17[3,6]	6.3
	Very Low	34[6]	6.3	15[6]	6.3
8	Low	35[3,6]	6.7	16[3]	6.9
	Very Low	32[6]	7.0	14[6]	7.0
9	Low	33[3]	8.0	14[3]	7.9
	Very Low	31[6]	8.2	-[4]	-[4]
10	Low	36[3]	6.5	16[3,6]	6.1
	Very Low	32	6.6	14	6.6
11	Low	38	6.1	16	6.1
	Very Low	29[5]	5.2	13[5]	5.2
12	Low	38[6]	6.3	16[3]	6.3
	Very Low	29[5]	5.7	14	5.7
13	Low	28[3]	12.9	11	13.1
	Very Low	27	13.1	-[4]	-[4]
14	Low	28[3]	12.6	12[3]	12.2
	Very Low	26	13.1	11	13.1
15	Low	28[3,6]	12.6	12[3,6]	12.2
	Very Low	26[6]	13.1	11[6]	13.1
16-a	Low	35[3,6]	7.1	15[3,6]	7.1
	Very Low	33[6]	7.3	-[4]	-[4]
16-b	Low	35[3,6]	7.1	15[3,6]	7.1
	Very Low	34[6]	7.3	-[4]	-[4]
16-c	Low	35[3,6]	7.1	15[3,6]	7.1
	Very Low	34[6]	7.3	-[4]	-[4]

Table 9 – IGU Glazing Layup 5[1] (cont.)

Window Number[2]	Level of Protection	Explosive Weight I		Explosive Weight II	
		Required Standoff (m)	Out-of-Plane Reaction (N/mm)	Required Standoff (m)	Out-of-Plane Reaction (N/mm)
17-a	Low	29[5]	2.2	13[5]	2.2
	Very Low	-[4]	-[4]	-[4]	-[4]
17-b	Low	30[3,6]	8.8	15[3,6]	7.4
	Very Low	29[6]	8.8	14[6]	8.8
17-c	Low	35[3,6]	7.1	15[3,6]	7.1
	Very Low	33[6]	7.3	-[4]	-[4]
18-a	Low	37[6]	6.3	17[3,6]	6.3
	Very Low	35[6]	6.3	15[3,6]	6.3
18-b	Low	39[6]	6.1	18[6]	6.1
	Very Low	37[6]	6.1	16[6]	6.1
18-c	Low	41[3]	5.9	19[3]	5.9
	Very Low	38	6.0	17	6.0

1 - See Table 3 for glazing layup description.

2 - See Table 4 for window geometry.

3 - Glazing provides MEDIUM LOP

4 - Level of Protection values overlap, only the highest LOP is shown.

5 - Standoff controlled by operable frame and meets MEDIUM LOP per paragraph 3-3.2.

6 - Standoff controlled by 12 mm airgap

Table 10 – IGU Glazing Layup 6[1]

Window Number[2]	Level of Protection	Explosive Weight I		Explosive Weight II	
		Required Standoff (m)	Out-of-Plane Reaction (N/mm)	Required Standoff (m)	Out-of-Plane Reaction (N/mm)
1	Low	22[3]	12.3	12[3]	11.9
	Very Low	-[4]	-[4]	-[4]	-[4]
2	Low	22[3],[6]	15.0	12[3],[6]	14.1
	Very Low	21[6]	16.3	11[6]	16.3
3	Low	19[3],[6]	24.1	10[3],[6]	24.1
	Very Low	-[4]	-[4]	-[4]	-[4]
4	Low	24[3],[6]	14.6	12[3],[6]	14.3
	Very Low	-[4]	-[4]	11[6]	14.6
5	Low	19[3],[6]	25.2	9[3]	23.3
	Very Low	-[4]	-[4]	-[4]	-[4]
6	Low	29[5]	2.8	13[5]	2.8
	Very Low	-[4]	-[4]	-[4]	-[4]
7	Low	29[5]	3.2	13[5]	3.2
	Very Low	-[4]	-[4]	-[4]	-[4]
8	Low	29[5]	3.6	13[5]	3.6
	Very Low	-[4]	-[4]	-[4]	-[4]
9	Low	29[5]	3.9	13[5]	3.9
	Very Low	-[4]	-[4]	-[4]	-[4]
10	Low	29[5]	4.6	13[5]	4.6
	Very Low	-[4]	-[4]	-[4]	-[4]
11	Low	29[5]	5.2	13[5]	5.2
	Very Low	-[4]	-[4]	-[4]	-[4]
12	Low	29[5]	5.7	13[5]	5.7
	Very Low	-[4]	-[4]	-[4]	-[4]
13	Low	19	26.1	9[3]	23.6
	Very Low	-[4]	-[4]	-[4]	-[4]
14	Low	21[3]	24.8	9[3]	24.4
	Very Low	20	26.1	-[4]	-[4]
15	Low	21[3],[6]	25.7	9[3],[6]	25.0
	Very Low	20[6]	26.1	-[4]	-[4]
16-a	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]
16-b	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]
16-c	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]

Table 10 – IGU Glazing Layup 6[1] (cont.)

Window Number[2]	Level of Protection	Explosive Weight I		Explosive Weight II	
		Required Standoff (m)	Out-of-Plane Reaction (N/mm)	Required Standoff (m)	Out-of-Plane Reaction (N/mm)
17-a	Low	29[5]	2.2	13[5]	2.2
	Very Low	-[4]	-[4]	-[4]	-[4]
17-b	Low	29[5]	2.3	13[5]	2.3
	Very Low	-[4]	-[4]	-[4]	-[4]
17-c	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]
18-a	Low	29[5]	2.2	13[5]	2.2
	Very Low	-[4]	-[4]	-[4]	-[4]
18-b	Low	29[3,6]	11.8	14[3,6]	11.8
	Very Low	-[4]	-[4]	-[4]	-[4]
18-c	Low	30[3]	11.7	15[3]	9.9
	Very Low	29[5]	2.4	14	12.1

1 - See Table 3 for glazing layup description.

2 - See Table 4 for window geometry.

3 - Glazing provides MEDIUM LOP

4 - Level of Protection values overlap, only the highest LOP is shown.

5 - Standoff controlled by operable frame and meets MEDIUM LOP per paragraph 3-3.2.

6 - Standoff controlled by 12 mm airgap

Table 11 – IGU Glazing Layup 7[1]

Window Number[2]	Level of Protection	Explosive Weight I		Explosive Weight II	
		Required Standoff (m)	Out-of-Plane Reaction (N/mm)	Required Standoff (m)	Out-of-Plane Reaction (N/mm)
1	Low	19[3]	17.7	10[3]	18.8
	Very Low	-[4]	-[4]	-[4]	-[4]
2	Low	18[3,6]	24.1	10[3,6]	22.4
	Very Low	-[4]	-[4]	-[4]	-[4]
3	Low	16[3,6]	36.7	8[3,6]	37.1
	Very Low	-[4]	-[4]	-[4]	-[4]
4	Low	21[3,6]	21.0	10[3,6]	20.7
	Very Low	20[6]	21.9	-[4]	-[4]
5	Low	16[3,6]	36.6	7[3]	38.9
	Very Low	-[4]	-[4]	-[4]	-[4]
6	Low	29[5]	2.8	13[5]	2.8
	Very Low	-[4]	-[4]	-[4]	-[4]
7	Low	29[5]	3.2	13[5]	3.2
	Very Low	-[4]	-[4]	-[4]	-[4]
8	Low	29[5]	3.6	13[5]	3.6
	Very Low	-[4]	-[4]	-[4]	-[4]
9	Low	29[5]	3.9	13[5]	3.9
	Very Low	-[4]	-[4]	-[4]	-[4]
10	Low	29[5]	4.6	13[5]	4.6
	Very Low	-[4]	-[4]	-[4]	-[4]
11	Low	29[5]	5.2	13[5]	5.2
	Very Low	-[4]	-[4]	-[4]	-[4]
12	Low	29[5]	5.7	13[5]	5.7
	Very Low	-[4]	-[4]	-[4]	-[4]
13	Low	16[3]	39.2	8[3]	33.4
	Very Low	-[4]	-[4]	7	38.9
14	Low	17[3]	39.2	8[3]	34.0
	Very Low	-[4]	-[4]	7	39.2
15	Low	18[3,6]	37.6	9[3,6]	30.4
	Very Low	17[6]	39.2	-[4]	-[4]
16-a	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]
16-b	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]
16-c	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]

Table 11 – IGU Glazing Layup 7[1] (cont.)

Window Number[2]	Level of Protection	Explosive Weight I		Explosive Weight II	
		Required Standoff (m)	Out-of-Plane Reaction (N/mm)	Required Standoff (m)	Out-of-Plane Reaction (N/mm)
17-a	Low	29[5]	2.16	13[5]	2.2
	Very Low	-[4]	-[4]	-[4]	-[4]
17-b	Low	29[5]	2.31	13[5]	2.3
	Very Low	-[4]	-[4]	-[4]	-[4]
17-c	Low	29[5]	2.43	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]
18-a	Low	29[5]	2.16	13[5]	2.2
	Very Low	-[4]	-[4]	-[4]	-[4]
18-b	Low	29[5]	2.31	13[5]	2.3
	Very Low	-[4]	-[4]	-[4]	-[4]
18-c	Low	29[5]	2.43	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]

1 - See Table 3 for glazing layup description.

2 - See Table 4 for window geometry.

3 - Glazing provides MEDIUM LOP

4 - Level of Protection values overlap, only the highest LOP is shown.

5 - Standoff controlled by operable frame and meets MEDIUM LOP per paragraph 3-3.2.

6 - Standoff controlled by 12 mm airgap

Table 12 – IGU Glazing Layup 8[1]

Window Number[2]	Level of Protection	Explosive Weight I		Explosive Weight II	
		Required Standoff (m)	Out-of-Plane Reaction (N/mm)	Required Standoff (m)	Out-of-Plane Reaction (N/mm)
1	Low	28[3]	7.8	14[3]	7.4
	Very Low	27	7.7	13	7.3
2	Low	28[3]	10.4	14	8.0
	Very Low	27	9.5	13[3]	10.4
3	Low	24[3]	12.8	12[3,6]	12.7
	Very Low	-[4]	-[4]	-[4]	-[4]
4	Low	34[3,6]	7.1	14[3]	7.6
	Very Low	31[6]	7.3	-[4]	-[4]
5	Low	27[3,6]	12.6	12[3,6]	12.6
	Very Low	26[6]	13.1	11	12.5
6	Low	34[3,6]	7.1	14[3]	7.6
	Very Low	31[6]	7.3	-[4]	-[4]
7	Low	37[3,6]	6.3	16[3,6]	6.2
	Very Low	33[6]	6.3	14[6]	6.3
8	Low	35[3,6]	7.0	16[3,6]	7.3
	Very Low	32[6]	7.3	14	6.9
9	Low	33[3]	7.8	15[3,6]	8.1
	Very Low	31[6]	8.2	13[5]	3.9
10	Low	35[3,6]	6.5	16[3,6]	6.1
	Very Low	32[6]	6.6	13[5]	4.6
11	Low	36[3,6]	6.1	16[3]	5.8
	Very Low	29[6]	6.1	13[5]	5.2
12	Low	36[3,6]	6.3	15	6.3
	Very Low	29[5]	5.7	13[5]	5.7
13	Low	28[3,6]	12.5	11[3,6]	12.6
	Very Low	27[6]	13.1	-[4]	-[4]
14	Low	27[3,6]	13.0	11[3,6]	12.9
	Very Low	26	13.1	-[4]	-[4]
15	Low	27[3,6]	12.5	11[3]	12.7
	Very Low	26[6]	13.1	-[4]	-[4]
16-a	Low	34[3,6]	7.1	14[3]	7.6
	Very Low	32[6]	7.3	-[4]	-[4]
16-b	Low	34[3,6]	7.1	15[3]	8.1
	Very Low	32[6]	7.3	14[3]	7.6
16-c	Low	34[3]	7.1	15[3,6]	8.1
	Very Low	33	7.3	14[3,6]	7.6

Table 12 – IGU Glazing Layup 8[1] (cont.)

Window Number[2]	Level of Protection	Explosive Weight I		Explosive Weight II	
		Required Standoff (m)	Out-of-Plane Reaction (N/mm)	Required Standoff (m)	Out-of-Plane Reaction (N/mm)
17-a	Low	29[5]	2.2	13[5]	2.2
	Very Low	-[4]	-[4]	-[4]	-[4]
17-b	Low	29[3],[6]	8.6	14[3]	8.0
	Very Low	-[4]	-[4]	-[4]	-[4]
17-c	Low	34[3],[6]	7.1	14[3]	7.6
	Very Low	32[6]	7.3	-[4]	-[4]
18-a	Low	37[3],[6]	6.3	16[3]	6.2
	Very Low	35[6]	6.3	14[3]	6.3
18-b	Low	39[6]	6.1	17[3]	5.6
	Very Low	37[6]	6.1	16	6.1
18-c	Low	41[3]	6.0	17[3]	5.9
	Very Low	38	6.0	16	6.0

1 - See Table 3 for glazing layup description.

2 - See Table 4 for window geometry.

3 - Glazing provides MEDIUM LOP

4 - Level of Protection values overlap, only the highest LOP is shown.

5 - Standoff controlled by operable frame and meets MEDIUM LOP per paragraph 3-3.2.

6 - Standoff controlled by 12 mm airgap

Table 13 – IGU Glazing Layup 9[1]

Window Number[2]	Level of Protection	Explosive Weight I		Explosive Weight II	
		Required Standoff (m)	Out-of-Plane Reaction (N/mm)	Required Standoff (m)	Out-of-Plane Reaction (N/mm)
1	Low	21	12.2	12	10.6
	Very Low	-[4]	-[4]	11	12.6
2	Low	21[3]	15.7	11[3,6]	15.0
	Very Low	-[4]	-[4]	-[4]	-[4]
3	Low	18[3,6]	25.4	10[3,6]	22.8
	Very Low	-[4]	-[4]	-[4]	-[4]
4	Low	24[3,6]	13.4	12[3,6]	14.3
	Very Low	23[6]	14.6	-[4]	-[4]
5	Low	19[3,6]	25.5	9[3,6]	24.0
	Very Low	-[4]	-[4]	-[4]	-[4]
6	Low	29[5]	2.8	13[5]	2.8
	Very Low	-[4]	-[4]	-[4]	-[4]
7	Low	29[5]	3.2	13[5]	3.2
	Very Low	-[4]	-[4]	-[4]	-[4]
8	Low	29[5]	3.6	13[5]	3.6
	Very Low	-[4]	-[4]	-[4]	-[4]
9	Low	29[5]	3.9	13[5]	3.9
	Very Low	-[4]	-[4]	-[4]	-[4]
10	Low	29[5]	4.6	13[5]	4.6
	Very Low	-[4]	-[4]	-[4]	-[4]
11	Low	29[5]	5.2	13[5]	5.2
	Very Low	-[4]	-[4]	-[4]	-[4]
12	Low	29[5]	5.7	13[5]	5.7
	Very Low	-[4]	-[4]	-[4]	-[4]
13	Low	19[3]	24.6	8[3]	25.9
	Very Low	-[4]	-[4]	-[4]	-[4]
14	Low	20[3]	24.3	9[3]	23.0
	Very Low	19	26.1	8	26.1
15	Low	20[3,6]	25.7	9[3,6]	22.8
	Very Low	-[4]	-[4]	8[6]	26.1
16-a	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]
16-b	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]
16-c	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]

Table 13 – IGU Glazing Layup 9[1] (cont.)

Window Number[2]	Level of Protection	Explosive Weight I		Explosive Weight II	
		Required Standoff (m)	Out-of-Plane Reaction (N/mm)	Required Standoff (m)	Out-of-Plane Reaction (N/mm)
17-a	Low	29[5]	2.2	13[5]	2.2
	Very Low	-[4]	-[4]	-[4]	-[4]
17-b	Low	29[5]	2.3	13[5]	2.3
	Very Low	-[4]	-[4]	-[4]	-[4]
17-c	Low	29[5]	2.4	13[5]	2.4
	Very Low	-[4]	-[4]	-[4]	-[4]
18-a	Low	29[5]	2.2	13[5]	2.2
	Very Low	-[4]	-[4]	-[4]	-[4]
18-b	Low	29[5]	2.3	13[5]	2.3
	Very Low	-[4]	-[4]	-[4]	-[4]
18-c	Low	29[5]	2.4	14[3]	10.5
	Very Low	-[4]	-[4]	-[4]	-[4]

1 - See Table 3 for glazing layup description.

2 - See Table 4 for window geometry.

3 - Glazing provides MEDIUM LOP

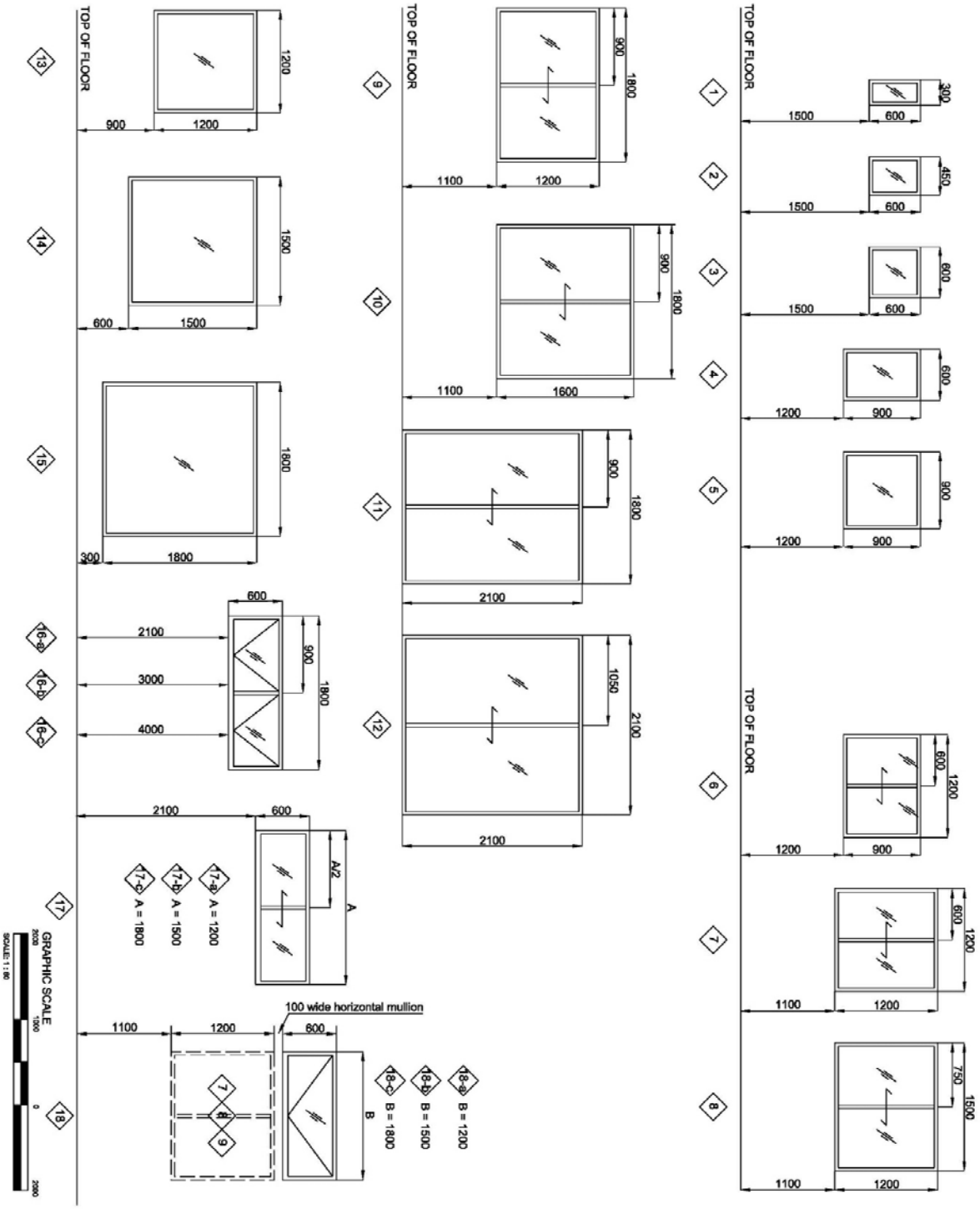
4 - Level of Protection values overlap, only the highest LOP is shown.

5 - Standoff controlled by operable frame and meets MEDIUM LOP per paragraph 3-3.2.

6 - Standoff controlled by 12 mm airgap

APPENDIX A

WINDOW GEOMETRIES



APPENDIX B

STANDOFF CALCULATION PROCEDURE FOR OPERABLE WINDOWS

Charge Weight I

$$SO = \left(\frac{STP}{233}\right)^{-.0893} \text{ for } 1 < STP < 4$$

Equation 1

$$SO = \left(\frac{STP}{327}\right)^{-.082} \text{ for } 4 < STP < 9$$

Equation 2

Charge Weight II

$$SO = \left(\frac{STP}{88.3}\right)^{-.0893} \text{ for } 1 < STP < 4$$

Equation 3

$$SO = \left(\frac{STP}{230}\right)^{-.069} \text{ for } 4 < STP < 9$$

Equation 4

Where:
STP = Structural Test Pressure (kPa)
SO = Standoff (m)

Out-of-Plane Load

$$Out - of - Plane\ Load = \frac{2 \times STP \times Area}{Perimeter}$$

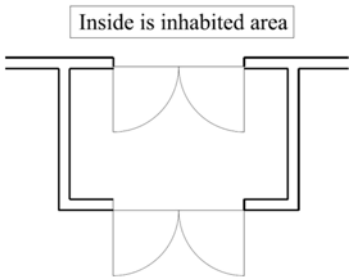
Equation 5

Where:
STP = Structural Test Pressure (kPa)
Area = Rough Opening Area (mm^2)
Out-of-Plane Load = Connection Line Load along Frame (N/mm)
Perimeter = Rough Opening Perimeter (mm)

APPENDIX C

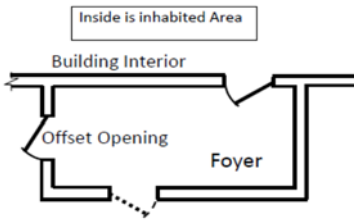
EXTERIOR DOOR STANDARDS

Vestibules (A)



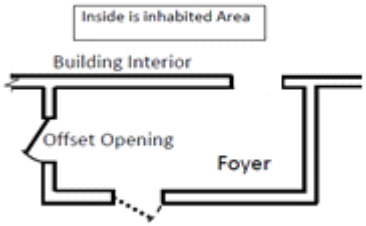
	Outer Door			Inner Door		
	Application	**Method**	**Criteria**	**Application**	**Method**	**Criteria**
1	Standard Door (Non-blast tested door)	n/a	n/a	Blast tested door	ASTM F2247 & ASTM F2927	UFC 4-010-01 B-3.3.1 & B-3.3.2
	Glazing	SBEDS-W or equivalent	UFC 4-010-01 Standard 10	Glazing	ASTM E1996 (Missiles A&D) ISO 16932 2007 (Missiles A & C)	UFC 4-010-01 Standard 10& B-3.3.4
2	Blast tested door	ASTM F2247 & ASTM F2927	UFC 4-010-01 B-3.3.1 & B-3.3.2	Standard Door (Non-blast tested door)	n/aGl	n/a
	Glazing	n/a	UFC 4-010-01 Standard 10	Glazing	SBEDS-W or equivalent	UFC 4-010-01 Standard 10
3	Analyzed door (Justified by SBEDS Ver5)	Where it is not possible to design intercepted door, designed to remain frame	UFC 4-010-01 B-3.3.3 Alternative design	Standard Door (Non-blast tested door)	n/a	n/a
	Glazing	Only small a vision glazing possible, 200mmx200mm	UFC 4-010-01 Standard 10	Glazing	SBEDS-W or equivalent	UFC 4-010-01 Standard 10

Vestibules (B)



	Outer Door			Inner Door		
	Application	**Method**	**Criteria**	**Application**	**Method**	**Criteria**
1	Standard Door (Non-blast tested door)	Position door will not be propelled into inhabited areas	UFC 4-010-01 B-3.3.3 Alternative design	Standard Door (Non-blast tested door)	n/a	n/a
	Glazing	SBEDS-W or equivalent	UFC 4-010-01 Standard 10	Glazing	SBEDS-W or equivalent	UFC 4-010-01 Standard 10

Vestibules (C)



	Outer Door			Inner Door		
	Application	**Method**	**Criteria**	**Application**	**Method**	**Criteria**
1	Standard Door (Non-blast tested door)	Position door will not be propelled into inhabited areas	UFC 4-010-01 B-3.3.3 Alternative design	n/a	n/a	n/a
	Glazing	SBEDS-W or equivalent	UFC 4-010-01 Standard 10	n/a	n/a	n/a

U.S. Army Engineer Corps of Engineers
Protective Design Center
(Attn: CENWO-ED-S)
1616 Capitol Ave, Ste 9000
Omaha, NE 68102-4901

402 – 995 – 2366
PDC.Web@usace.army.mil

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APPENDIX E

SPECIFICATIONS FORMATTING GUIDE TEMPLATE

by the Contracting Officer is required. Incorporation of methods, materials, and equipment that will promote cost-effective and timely maintenance, and that are otherwise authorized by the contract, is highly encouraged.

1.5 MANDATORY U.S. TESTED PRODUCTS

The following items shall meet U.S. testing methods (e.g. UL listed, FM approved, ASTM, etc.) and shall be labeled as required. These items shall not be substituted with Japanese testing methods (e.g. JIS, JASS, etc.) for certification:

a. Fire suppression systems, including valves, alarm valves, sprinklers (pipes and fittings of Japanese manufacturer may meet the function requirements). Fire suppression systems includes wet chemical, dry chemical, mist, deluge, pre-action, foam, and clean agent, in addition to standard sprinkler systems.

b. Fire pumps, including motors, controllers, drives, and valves.

c. Fire alarm and mass notification systems, including panels, initiating devices, notification appliances, smoke alarms (conductors and conduits of Japanese manufacturer may meet the functional requirements).

d. Engineering technician requirements for development of fire suppression systems and alarm system shop drawings, calculations, and material submittals.

e. Fire doors, smoke doors, and frames.

f. Fire dampers and smoke dampers.

g. Interior finishes with flame spread and smoke development ratings required for installation of rated assemblies.

h. Insulation with flame spread and smoke development ratings.

i. Fire proofing and fire stopping materials.

j. Plenum rated cables.

k. Domestic water supply piping in the building and plumbing fixtures that directly dispense potable drinking water (NSF stamped and/or labeled). Japanese plumbing fixtures that do not directly dispense potable drinking water are allowed, such as urinals and water closets.

1.6 KEY PERSONNEL QUALIFICATIONS

The Contractor's Project Key personnel shall not be assigned duties to any other Contracts (excluding the project manager) without approval from the Contracting Officer. The Project Superintendent, CQC System Manager, and Site Safety Health Officer shall all be separate persons, and shall not have other duties assigned. Within five (5) working days after receipt of the Notice to Proceed, the Contractor shall submit in writing to the Contracting Officer an organizational chart, the qualifications and background history of the proposed Key Personnel for approval. The Contracting Officer shall have the explicit right to determine acceptability (or rejection) of the proposed individuals. In addition,

APPENDIX F

RESIDENTIAL MOISTURE PREVENTION: ENGINEERING GUIDELINES (ECIFP)

JED Field Personnel Responsibilities:

1. Ensure the Contractor understands the importance of a fully sealed air barrier.
2. Inspect the exterior wall penetrations to ensure proper seals. Ensure firestopping or packing insulation was utilized where shown on the drawings, rather than only caulking.
3. Ensure the air barrier test is performed when required by the Specifications and review the test report to verify the integrity of the building envelope.

Base Housing Office Responsibilities (Instructions for the Tenants):

4. When the building is unoccupied for a week or longer, set the thermostats of the air conditioners (one per floor) to a higher setpoint, such as 26°C, or set the thermostat to dehumidification mode. This will limit the amount of condensation in the building while providing some dehumidification. Close all windows and turn off all exhaust fans.
5. Only run the exhaust fans when necessary. A continuously running fan will draw outside humid air into the building.
6. When cooking, always turn on the kitchen hood exhaust fan. This will remove humid cooking vapor to outside the home.
7. When showering or bathing, always turn on the bathroom exhaust fan. This will remove humid air to outside the home.
8. During humid summer periods,
    a. Consider using a stand-alone dehumidifier if permanently mounted dehumidifier is not provided in the housing unit. The split unit air conditioner provides some dehumidification, but the dedicated dehumidifier is more effective,
    b. Keep all windows closed to prevent humid air from entering the home,
    c. Do not use humidifiers
9. A lower temperature setting on the air conditioner will allow more humidity to condense on interior surfaces, particularly metal surfaces such as window frames and appliances. Consider setting the temperature setpoint higher during high humidity periods, but within your individual comfort level.
10. Check all HVAC equipment after power outages to ensure they are operating correctly.
11. Leave the dryer door open slightly to prevent condensation inside the dryer.
12. Periodically clean the air conditioner air filters.
13. Periodically wipe down interior exhaust fan vents such as in the bathroom and kitchen.
14. Notify maintenance if there is sign of water damage in the ceiling or other areas.

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APPENDIX G

TECHNICAL SERVICES PROCESS GUIDES

This appendix includes the following JED Technical Services Process Guides:

- Process Guide_RTA MAR2025.pdf
- Process Guide_Bidder Inquiries APR2025.pdf
- Process Guide_Amendments APR2025.pdf
- Process Guide_Conformed Sets APR2025.pdf

Note: Process Guides provided in APPENDIX H are for refence only, current as of April 2025. Consult Technical Services for the correct formatting or further inquiries for each project.

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APPENDIX G – TECH SERVICES PROCESS GUIDES

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READY TO ADVERTISE (RTA) SET

JAPAN ENGINEER DISTRICT

Engineering Support Branch (ESB) – Technical Services

CREATED: FEB 2024
Updated: MAR 2025

READY TO ADVERTISE (RTA) SET

JAPAN ENGINEER DISTRICT

Engineering Support Branch (ESB) – Technical Services

READY TO ADVERTISE SET - Issued for Solicitation (Contractor Pre-Award)

Ready To Advertise (RTA) Set Package Includes:

- RTA Set Drawings* (combined in a single, bookmarked .pdf file) – bookmarks shall match the drawing index
- RTA Set Specifications* (combined in a single, bookmarked .pdf file) – bookmarks shall match the specifications table of contents
- If applicable, as-builts or any other FIO documents* provided by the PM and/or TL.
- For Tech Services records only: All native digital source drawings (.dwg) and specification (.sec) files.
- For Engineering records only: Design Analysis

**RTA Set Drawings, RTA Set Specifications, As-Builts, and FIO document .pdf files shall not exceed 100MB each.*

Ready To Advertise Formatting (Refer to slides 3 thru 7 for examples):

1. JED will provide the solicitation number.

2. Do not include AE task order information on RTA drawings and specification documents.

3. RTA Drawings:
   - Add the solicitation number to the RTA drawing cover sheet.
   - Add the issue date (MMM YYYY) to the RTA drawing cover sheet.
   - Add 'RTA' to the bottom right footer on **ALL** drawing sheets.

4. RTA Specifications:
   - Utilize the specifications cover sheet template that is provided with the Japan Edited Specifications .sec files online (*https://www.poj.usace.army.mil/Business-With-Us/References/*).
   - Add the solicitation number to the RTA specifications cover sheet.
   - Add the issue date (MMM YYYY) to the RTA specifications cover sheet.
   - Add the solicitation number to the bottom left corner of the specification table of contents and **ALL** specification sections and attachments.
   - Add 'RTA' to the bottom right footer of the specification table of contents and **ALL** specification sections and attachments.

For Tech Services Only:

1. Refer to '*Specs Tasks Checklist.xlsx*' for RTA set distribution instructions.

READY TO ADVERTISE (RTA) SET

JAPAN ENGINEER DISTRICT

Engineering Support Branch (ESB) – Technical Services

RTA FORMATTING – DRAWINGS (IFB/RFP)

For Example Purposes Only

US Army Corps of Engineers ®

JAPAN ENGINEER DISTRICT

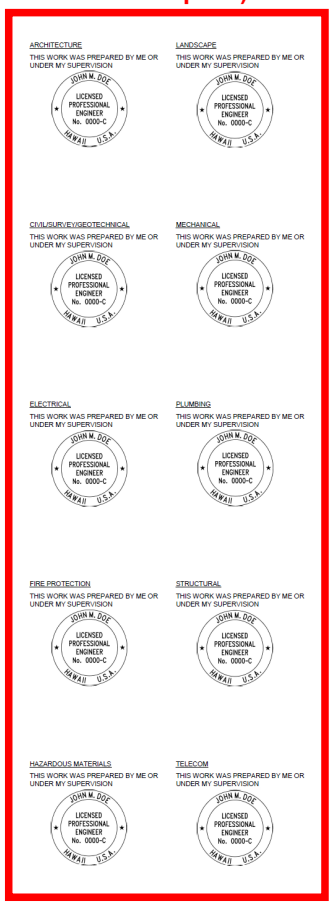
YOKOTA AIR BASE, JAPAN
IMPROVE FAMILY HOUSING, PAIP 8B

SOLICITATION NO.: W912HV-25-B-0001

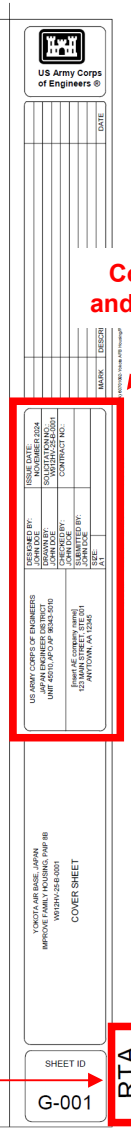
CONTRACT AWARD NO.: [leave blank until award]

ISSUE DATE: NOVEMBER 2024 ← RTA Submittal Date

Professional Seals (can be on drawings and/or specs)



Completed and Filled Out



RTA Footer

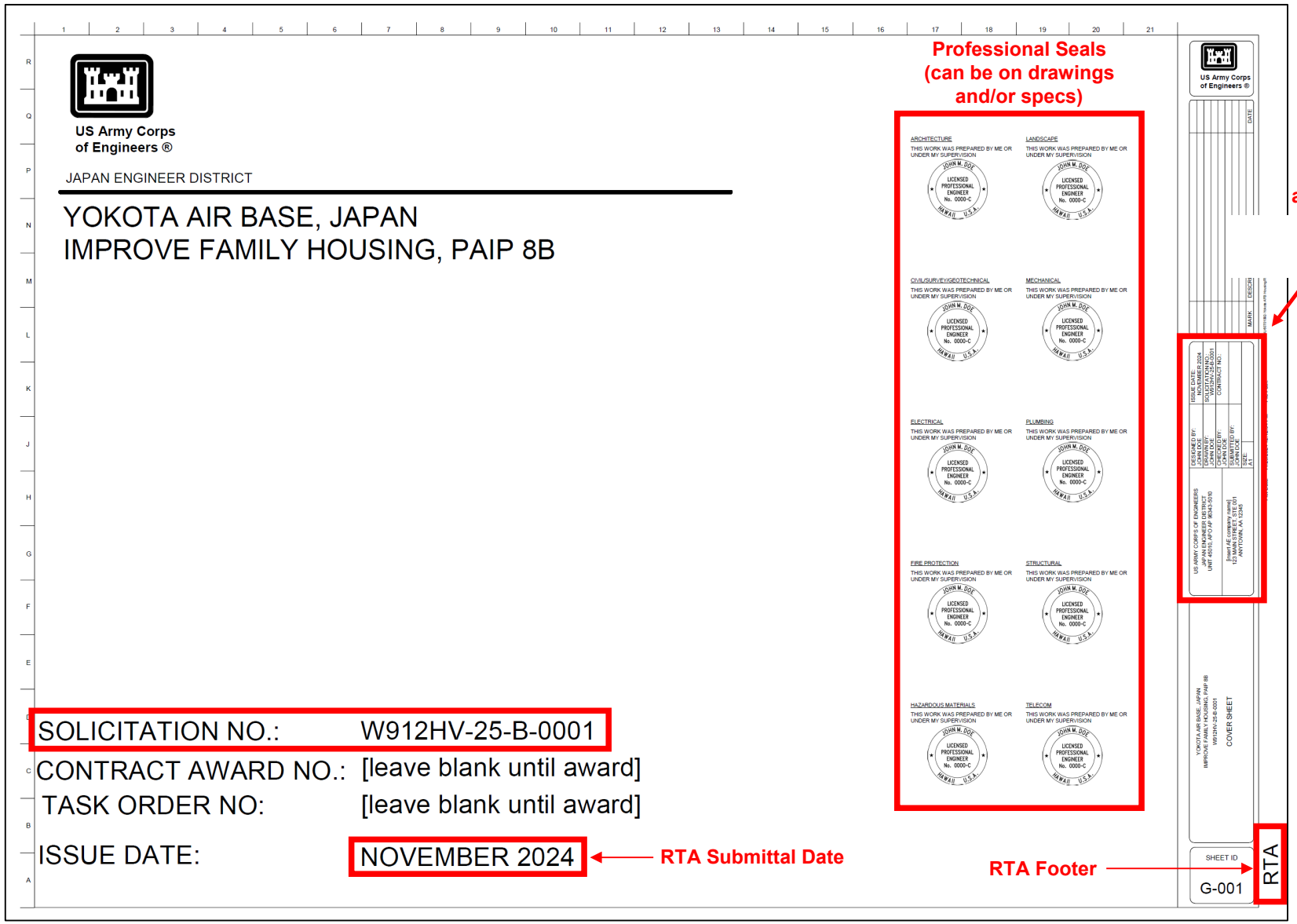
READY TO ADVERTISE (RTA) SET

JAPAN ENGINEER DISTRICT

Engineering Support Branch (ESB) – Technical Services

RTA FORMATTING – DRAWINGS (MATOC)

For Example Purposes Only



U.S. ARMY

US Army Corps of Engineers®

READY TO ADVERTISE (RTA) SET

JAPAN ENGINEER DISTRICT

Engineering Support Branch (ESB) – Technical Services

RTA FORMATTING – DRAWINGS (ALL CONTRACTS)

For Example Purposes Only

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P-952	GOQ PLUMBING DOMESTIC WATER ISOMETRIC DRAWINGS
MECHANICAL - 3GAW	
M-001	MECHANICAL GENERAL NOTES, ABBREVIATIONS
MD101	3GAW MECHANICAL SITE DEMOLITION PLANS
MD102	3GAW BUILDINGS 3287, 3290, & 3291 MECHANICAL DEMOLITION PLAN
MD401	3GAW BUILDINGS 3287, 3290, & 3291 MECHANICAL TYPICAL UNIT ENLARGED DEMOLITION PLANS
M-101	3GAW BUILDINGS 3287, 3290, & 3291 MECHANICAL PLANS
M-201	3GAW BUILDINGS 3287, 3290, & 3291 MECHANICAL ELEVATIONS
M-301	3GAW BUILDINGS 3287, 3290, & 3291 MECHANICAL SECTIONS
M-302	3GAW BUILDINGS 3287, 3290, & 3291 MECHANICAL SECTIONS
M-401	3GAW BUILDINGS 3287, 3290, & 3291 MECHANICAL TYPICAL UNIT ENLARGED FLOOR PLANS
M-501	MECHANICAL DETAILS
M-502	MECHANICAL DETAILS
M-601	3GAW MECHANICAL SCHEDULES
MECHANICAL - GOQ	
MD151	GOQ MECHANICAL DEMOLITION SITE PLAN
MD152	GOQ MECHANICAL DEMOLITION FLOOR PLAN
MD153	GOQ MECHANICAL DEMOLITION ROOF PLAN
MD451	GOQ MECHANICAL ENLARGED DEMOLITION FLOOR PLAN
M-151	GOQ MECHANICAL FLOOR PLAN
M-351	GOQ MECHANICAL SECTIONS
M-651	GOQ MECHANICAL SCHEDULES
ELECTRICAL	
E-001	ABBREVIATIONS, SYMBOLS AND GENERAL NOTES
ES101	PARTIAL ENLARGED ELECTRICAL SITE DEMOLITION PLAN
ES102	PARTIAL ENLARGED ELECTRICAL SITE DEMOLITION PLAN
ED101	OVERALL ELECTRICAL DEMOLITION PLANS BUILDINGS 3287, 3290, 3291
ED401	ENLARGED TYPICAL UNIT ELECTRICAL DEMOLITION PLAN
ES103	PARTIAL ENLARGED ELECTRICAL SITE PLAN
ES104	PARTIAL ENLARGED ELECTRICAL SITE PLAN
E-101	OVERALL ELECTRICAL FLOOR PLAN - NEW WORK BUILDINGS 3287, 3290, 3291
E-401	ENLARGED UNIT POWER PLANS
E-402	ENLARGED UNIT LIGHTING PLANS
E-403	ENLARGED FIRE RISER AREA POWER AND LIGHTING PLANS
ES051	ELECTRICAL SITE DEMOLITION PLAN BUILDING 691
ES052	ELECTRICAL SITE PLAN BUILDING 691
ED050	ELECTRICAL DEMOLITION PLAN
E-151	ELECTRICAL POWER PLAN
E-152	ELECTRICAL LIGHTING PLAN
E-457	ENLARGED PLAN KITCHEN
E-501	DETAILS
E-502	DETAILS
E-503	DETAILS
E-504	DETAILS
E-601	SINGLE LINE DIAGRAM - TS-34-8
E-602	SINGLE LINE DIAGRAM - TS-34-5
E-603	SINGLE LINE DIAGRAM - BUILDINGS 3287, 3290, 3291 DEMOLITION
E-604	SINGLE LINE DIAGRAM - BUILDINGS 3287, 3290
E-605	SINGLE LINE DIAGRAM - BUILDING 3291
E-606	SINGLE LINE DIAGRAM
E-701	LIGHTING FIXTURE SCHEDULE
E-702	PANEL SCHEDULES
E-703	PANEL SCHEDULES
TELECOM	
T-001	GENERAL NOTES AND SYMBOLS LEGEND
TS001	TELECOM SITE NEW CONSTRUCTION PLAN - TOWNHOMES
TD001	OVERALL ELECTRICAL DEMOLITION PLANS - TOWNHOMES
T-401	ENLARGED TELECOM PLANS - 3GAW
T-402	ENLARGED TELECOM PLANS - 3GAW
TS002	TELECOM SITE PLAN - GOQ
TD002	TELECOM DEMOLITION PLAN - GOQ
T-120	TELECOM PLAN - GOQ
T-403	ENLARGED PLAN - GOQ
GRAND TOTAL SHEETS: 296	

US Army Corps of Engineers®

ISSUE DATE:

DESIGNED BY:

US ARMY CORPS OF ENGINEERS

SHEET INDEX

SHEET ID

G-002

RTA

Completed and Filled Out

RTA Footer

READY TO ADVERTISE (RTA) SET

JAPAN ENGINEER DISTRICT

Engineering Support Branch (ESB) – Technical Services

RTA FORMATTING – SPECIFICATIONS (IFB/RFP)

For Example Purposes Only

SPECIFICATIONS COVER PAGE

US Army Corps of Engineers
Japan District

FY25 PROJECT RISING SUN
CAMP ZAMA, JAPAN

SPECIFICATIONS

RTA Submittal ← RTA Cover Title

SOLICITATION NO.: W912HV25B0001
CONTRACT AWARD NO.: TBD

JANUARY 2025 ← RTA Submittal Date

SPECIFICATION PAGES

FY25 Project Rising Sun 25NA0001
Camp Zama, Japan

PROJECT TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

Solicitation Number — RTA Footer

READY TO ADVERTISE (RTA) SET

JAPAN ENGINEER DISTRICT

Engineering Support Branch (ESB) – Technical Services

RTA FORMATTING – SPECIFICATIONS (MATOC)

For Example Purposes Only

SPECIFICATIONS COVER PAGE

US Army Corps of Engineers
Japan District

FY25 PROJECT RISING SUN
CAMP ZAMA, JAPAN

$245M Okinawa MATOC Program

SPECIFICATIONS

RTA Submittal ← RTA Cover Title

SOLICITATION NO.: MATOC295(O)25R0001
CONTRACT AWARD NO.: TBD
TASK ORDER NO.: TBD

JANUARY 2025 ← RTA Submittal Date

SPECIFICATION PAGES

FY25 Project Rising Sun 25NA0001
Camp Zama, Japan

PROJECT TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

MATOC Solicitation Number — RTA Footer

BIDDER INQUIRY PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

CREATED: April 2025

BIDDER INQUIRY and AMENDMENT PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

PROCESS FLOWCHART – U.S. PROJECTS

Duration periods vary from project to project. Confirm schedule with the Project Manager

SOLICITATION PERIOD

ACTION:

- Contracting issues RTA solicitation package
- Technical Services (TS) schedules Bidder RFI LIR within one week of bidder RFI period closing

Duration:
30 - 60 Days

RTA Package Issued For Solicitation

Bidder RFI Period Opens/Closes

PROCESS RFIs

ACTION:

- TS compiles bidder inquires from ProjNet into the bidder RFI spreadsheet
- Technical Lead (TL) assigns a discipline and responsibility for each bidder RFI
- TL distributes bidder RFI spreadsheet to PDT/DOR for review prior to Bidder RFI LIR

Duration:
2 - 7 Days

TS Compiles Bidder RFI Spreadsheet

TL Assigns Bidder RFIs & Sends to PDT/DOR

BIDDER RFI LIR

ACTION:

- TS facilitates Bidder RFI LIR

Duration:
1 Day

TS Facilitates Bidder RFI LIR

RFI RESPONSES DEVELOPMENT

ACTION:

- TL coordinates bidder inquiry responses with PDT/DOR
- PDT/DOR adds Preliminary Response in the bidder RFI spreadsheet and submits amended documents.

Duration:
14 Days

TL Coordinates Bidder RFI Responses

PDT/DOR Adds Preliminary Responses & Submits Amended Documents

RFI RESPONSES QA

ACTION:

- TL conducts QA of all bidder inquiry responses and amended documents
- TL adds Engineering Final Response in the bidder RFI spreadsheet
- TS conducts QA of all Engineering Final Responses and amended documents
- TS adds TS Final Response in the bidder RFI spreadsheet
- TS compiles amendment package and sends to Contracting (CT)

Duration:
14 Days

TL QA and Adds Engineering Final Responses

TS QA and Adds TS Final Response

TS Compiles Amendment Package for CT

CONTRACTING & LEGAL REVIEW

ACTION:

- CT conducts QA of all TS Final Responses and amended documents
- CT coordinates Office of Counsel (OC) review. OC reviews TS Final Responses and amended documents that results in a change of the original contract requirements.

Duration:
7 - 14 Days

CT QA

OC Legal Review

BIDDER RFI CLOSEOUT

ACTION:

- CT issues bidder RFI responses in ProjNet
- CT issues amendment package to bidders

CT Issues Bidder RFI Responses and Amendment

For Tech Services Only:

1. Refer to '*Specs Tasks Checklist.xlsx*' for additional bidder inquiry, bidder RFI LIR, and amendment instructions.

BIDDER INQUIRY and AMENDMENT PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

BIDDER RFI AND AMENDMENT SCHEDULE

Event [a]	Durations
1. RFI Open Period	30 – 60 Days
2. Process RFIs	2 – 7 Days
3. RFI LIR	1 Day
4. Initial RFI Responses Due	7 Days [b]
5. Initial Amendment Documents Due	7 Days [b]
6. Engineering QA (TL & TS) Review	14 Days [c]
7. CT Review	7 Days
8. OC Review	7 Days
9. Issue Final Amendments / RFIs	Complete

Duration periods vary from project to project. Confirm schedule with the Project Manager*

This Bidder RFI and Amendment Schedule is included in the Bidder RFI LIR meeting invite.

Notes:

a. **Event:** Refer to the Process Flowchart (slide 2) for descriptions of each event.

b. **Initial RFI Responses Due and Initial Amendment Documents Due:** To facilitate TL and TS bidder RFI response review, PDT/DOR shall submit initial bidder RFI responses within 7 days of the Bidder RFI LIR. Amended documents should be submitted 7 days after the initial bidder RFI responses are provided.

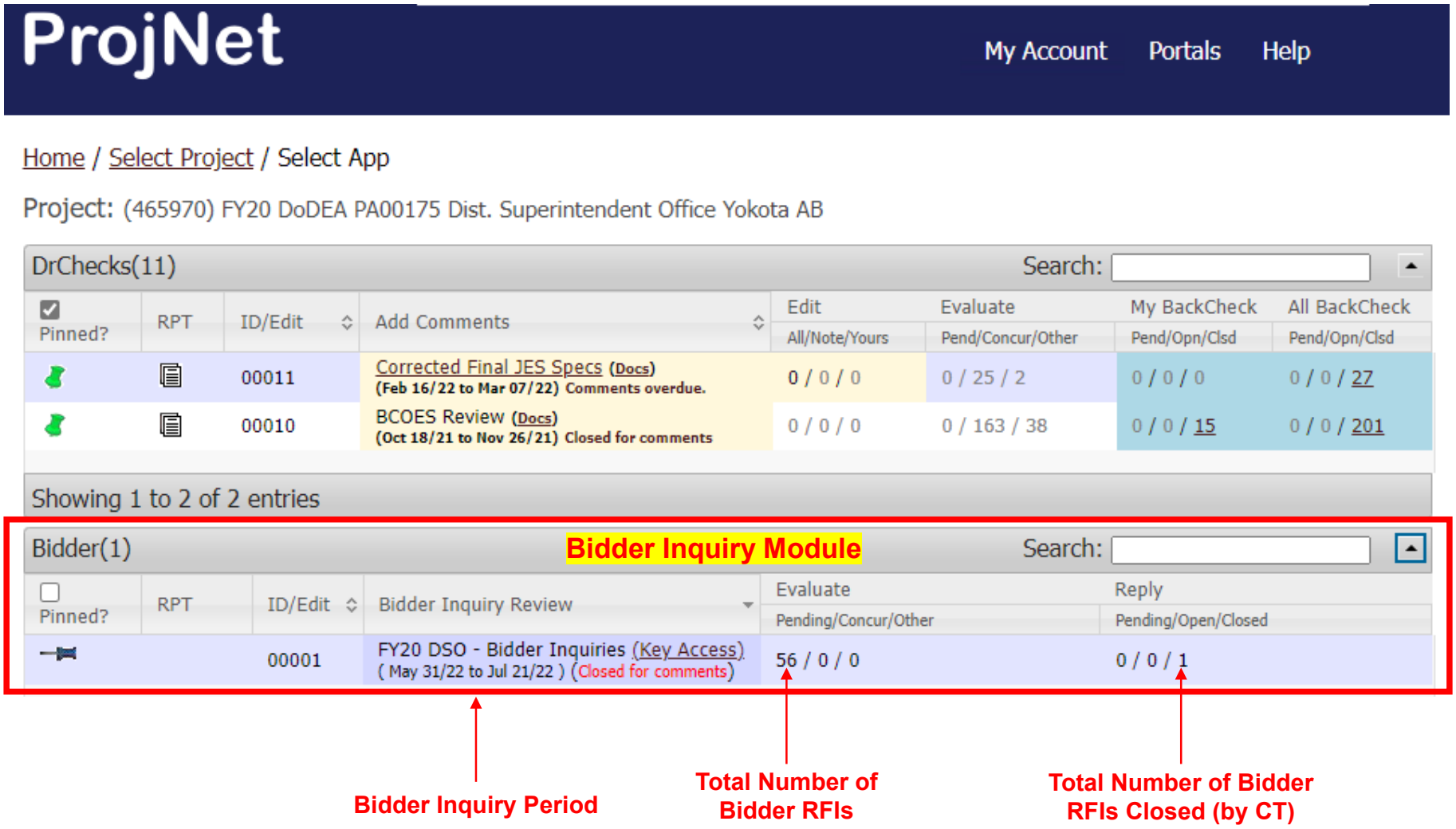
c. **Engineering QA (TL & TS) Review:** TL and TS may conduct their reviews of bidder RFI responses concurrently. TS will only review bidder RFI responses marked “Yes” in the “TL QA Reviewed” column of the bidder RFI spreadsheet.

BIDDER INQUIRY PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

PROJNET - BIDDER INQUIRIES



Note: Generally, ProjNet bidder inquiry reviews are accessible to the PM, CT, TL, and TS.

BIDDER INQUIRY PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

RFI WORKSHEET - BIDDER INQUIRY RESPONSES

BIDDER INQUIRY RESPONSE GUIDELINES:

- Ensure response adequately addresses bidder inquiry.
  - Example: If the bidder inquiry asks a yes/no question, response should clearly state yes/no.
  - Example: If the bidder inquiry includes multiple parts/questions, ensure all parts/questions are responded to.

- If applicable for design clarifications (no amendment required), ensure response refers to a drawing or specification. New design requirements cannot be provided to bidders through a bidder RFI response. Instead, drawings and/or specifications shall be amended.

- Ensure response does not create a conflict between the drawings and specifications. If it does, amend drawings and/or specifications, as necessary.

STANDARD RESPONSES:

- If applicable, utilize standard responses (which have been vetted by CT and OC) when responding to bidder inquiries.

DIFFERENCE BETWEEN PROPOSE AND BID:

- *Propose* as Advertised:
  - "Propose" is used for Request for Proposal (RFP) acquisitions
  - "R" is in the solicitation number
- *Bid* as Advertised:
  - "Bid" is used for Invitation for Bid (IFB) acquisitions
  - "B" is in the solicitation number

****ENSURE THE CORRECT TERM IS USED IN THE BIDDER RFI RESPONSE****

Bidder Inquiry Standard Responses

Copy and paste from the following list

Condition or Case	Standard Response Language
No changes *General*	Propose/Bid as advertised. Conduct work in accordance with drawings and specifications.
RFI Clarifications (No Amendment Req'd)	Refer to drawing(s) **XX-XXX**. Refer to specification section **XX XX XX**, paragraph **X.X** *(Briefly describe the clarification, e.g. "Dimension of door is shown on Detail 2.")*
RFI Amendment Repsonse	See revised sheet **XX-XXX** in **AM-000X**. See revised specification section **XX XX XX**, paragraph **X.X** in **AM-000X**. *(Briefly describe the clarification, e.g. "Dimension of door is shown on Detail 2.")*
Proposed Japanese alternative products	Refer to specification section 01 11 00.00 10, paragraph 1.5 for mandatory U.S. tested products. For other products, Japanese standards not referenced in the project specifications as being acceptable alternatives to US standards, may be submitted to the Contracting Officer for consideration as acceptable alternatives after contract award using the variation request process set forth in specification section 01 33 00, paragraph 1.9. Prior to the use of such proposed additional alternative Japanese standards, written approval by the Contracting Officer is
Government witness of tests	Government reserves the right to witness tests. Any/All associated costs related to Government personnel travel to witness testing will be solely at the Government's expense.
No changes: *Means and Methods*	Any means and methods to meet the requirement shall be determined by the Contractor. Propose/Bid as advertised.
No changes: *Contractor to determine*	The Contractor shall make their own determination on the manufacturer and model of products based upon the Contract documents. Propose/Bid as advertised.
Proposed Japanese alternative products	Products with Japanese standards not referenced in the specifications may be submitted for Government approval in accordance with specification section 01 33 00, paragraph 1.9. Prior to the use of such proposed alternative Japanese standards, written approval by the Contracting Officer is required.
Contractor proposed variations	Variations may be approved after construction contract award. Submit variations in accordance with specification section 01 33 00, paragraph 1.9. Propose/Bid as advertised.
Existing as-builts	"As-Built" drawings are provided for informational purposes only (FIO). These "As-Built" drawings are not part of the solicitation (and will not become part of the contract) and do not amend the solicitation (specifications, drawings, etc.). "As-Builts" drawings may not be complete or depict existing conditions.
Information from site survey: non-binding	Information provided during the site survey is unofficial and non-binding. For any conflicts that may arise, the terms and conditions of the solicitation will govern.
Differing site conditions	If actual conditions are different than what is shown in the contract, request for equitable adjustments may be submitted if the contractor meets the elements of an applicable equitable adjustment contract clause.
Differing site conditions	If conditions at the site differ materially from those indicated in the contract or there are discrepancies in figures, drawings, or specifications, contractor should follow procedures in FAR 52.236-2 Differing Site Conditions, FAR 52.236-22 Specifications and Drawings for Construction, DFARS 252.236-7001 Contract Drawings and Specifications and/or other terms and conditions as applicable.

... | User Guide | Macros | Instructions | Standard Responses | RFI Schedule | AM Tracking | ⊕

'Standard Responses' Tab in the Bidder RFI Spreadsheet

BIDDER INQUIRY PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

RFI WORKSHEET TEMPLATE - BIDDER INQUIRIES RESPONSES

Assigned Party/TL Coordination

Item No	Comment ID	Discipline	Sheet	Detail	Spec	Comment Text	Assigned Discipline	Assigned Party	Response Discussions	Preliminary Response	Amend Required	Engineering Final Response	TL QA Reviewed	Tech Services Final Response	Contracting Response
1	11111111	Specifications			33 30 00 Parag. 2.1.2	Are there any pressure lines required in the system? If there are, please provide location in the plan and detail drawings?	Civil	AE(DBB)		See revised specification section 33 30 00, paragraph 2.1.2 in AM-0003 which removed section and sanitary sewer pressure lines as there are none included in this design.	Yes	See revised specification section 33 30 00, paragraph 2.1.2 in AM-0003 which removed section and sanitary sewer pressure lines as there are none included in this design.	Yes	See revised specification section 33 30 00, paragraph 2.1.2 in AM-0003. Removed sanitary sewer pressure lines since they are not required.	Concur
2	11111112	Civil	VOL1/CS503	Detail 2		What is the zigzag line that shown in Detail 2 represents?	Civil	AE(DBB)	Zigzag line represents the double barbed wire lines. This gate detail was used from the apron paving contract.	15 APR: See Vol I revised sheet CS503 detail 2 in AM-0003 which calls out the zig zag line as a double barbed wire indicator. 02 APR: "Zigzag line represents the double barbed wire lines."	Yes	See Vol I revised sheet CS503 detail 2 in AM-0003 which calls out the zig zag line as a double barbed wire indicator.	Yes	See revised Volume 1, detail 2/CS503. Added callout for zigzag line, which represent double barbed wire.	Concur
3	11111113	Specifications			32 05 33 Parag. 3.3.3	Please confirm whether Turf-Mow is required during the Maintennace Period.	Civil	AE(DBB)		Yes, Propose/Bid as advertised. Conduct work in accordance with drawings and specifications.	No	Yes, conduct work in accordance with Specifications Section 32 05 33, Para. 3.3.3. Propose/Bid as advertised.	Yes	Yes. Bid as advertised. Conduct work in accordance with drawings and specifications.	Concur
4	11111114	Electrical	VOL 2 Drawing EP401			As there is no detailed drawing of RM107 (Electrical room) on EP401, the location of panel board is not clear. Please add detailed drawing.	Electrical	AE(DBB)	Info in drwgs/specs is adequate	Propose/Bid as advertised. Conduct work in accordance with drawings and specifications. Electrical room plan provided on Vol 2 sheet EP401.	No	Electrical Room #147 plan is shown on VOL2 Sheet EP104. Propose/Bid as advertised. Conduct work in accordance with drawings and specifications.	Yes	Refer to Volume 2, sheet EP104 for Room 107 power plan for panel board locations. Bid as advertised. Conduct work in accordance with drawings and specifications.	Concur

Technical Services:
Populate Bidder RFI Spreadsheet

Technical Lead:
Assign Discipline & Responsibility/Party (Prior To RFI LIR Meeting)

TS/TL/DOR:
Document RFI LIR Discussions

Assigned Party:
Provide Preliminary Response and Confirm if Amendment is Required

Technical Lead:
QA and Provide Final Response

Technical Services:
QA and Provide Final Response

CT:
QA

Notes:

1. Only edit or update the columns as specifically assigned above.
2. If updates/revisions are necessary in the Discussions or Response columns for an RFI, include these updates within the same cell(s) and add the date for each update (for tracking purposes), ensuring the updates are in descending order.
3. Do not add additional columns or rename columns without consulting with Tech Services.

AMENDMENT PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

CREATED: April 2025

BIDDER INQUIRY and AMENDMENT PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

PROCESS FLOWCHART – U.S. PROJECTS

Duration periods vary from project to project. Confirm schedule with the Project Manager

SOLICITATION PERIOD

ACTION:

- Contracting issues RTA solicitation package
- Technical Services (TS) schedules Bidder RFI LIR within one week of bidder RFI period closing

Duration:
30 - 60 Days

RTA Package Issued For Solicitation

Bidder RFI Period Opens/Closes

PROCESS RFIs

ACTION:

- TS compiles bidder inquires from ProjNet into the bidder RFI spreadsheet
- Technical Lead (TL) assigns a discipline and responsibility for each bidder RFI
- TL distributes bidder RFI spreadsheet to PDT/DOR for review prior to Bidder RFI LIR

Duration:
2 - 7 Days

TS Compiles Bidder RFI Spreadsheet

TL Assigns Bidder RFIs & Sends to PDT/DOR

BIDDER RFI LIR

ACTION:

- TS facilitates Bidder RFI LIR

Duration:
1 Day

TS Facilitates Bidder RFI LIR

RFI RESPONSES DEVELOPMENT

ACTION:

- TL coordinates bidder inquiry responses with PDT/DOR
- PDT/DOR adds Preliminary Response in the bidder RFI spreadsheet and submits amended documents.

Duration:
14 Days

TL Coordinates Bidder RFI Responses

PDT/DOR Adds Preliminary Responses & Submits Amended Documents

RFI RESPONSES QA

ACTION:

- TL conducts QA of all bidder inquiry responses and amended documents
- TL adds Engineering Final Response in the bidder RFI spreadsheet
- TS conducts QA of all Engineering Final Responses and amended documents
- TS adds TS Final Response in the bidder RFI spreadsheet
- TS compiles amendment package and sends to Contracting (CT)

Duration:
14 Days

TL QA and Adds Engineering Final Responses

TS QA and Adds TS Final Response

TS Compiles Amendment Package for CT

CONTRACTING & LEGAL REVIEW

ACTION:

- CT conducts QA of all TS Final Responses and amended documents
- CT coordinates Office of Counsel (OC) review. OC reviews TS Final Responses and amended documents that results in a change of the original contract requirements.

Duration:
7 - 14 Days

CT QA

OC Legal Review

BIDDER RFI CLOSEOUT

ACTION:

- CT issues bidder RFI responses in ProjNet
- CT issues amendment package to bidders

CT Issues Bidder RFI Responses and Amendment

For Tech Services Only:

1. Refer to '*Specs Tasks Checklist.xlsx*' for additional bidder inquiry, bidder RFI LIR, and amendment instructions.

BIDDER INQUIRY and AMENDMENT PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

BIDDER RFI AND AMENDMENT SCHEDULE

Event [a]	Durations
1. RFI Open Period	30 – 60 Days
2. Process RFIs	2 – 7 Days
3. RFI LIR	1 Day
4. Initial RFI Responses Due	7 Days [b]
5. Initial Amendment Documents Due	7 Days [b]
6. Engineering QA (TL & TS) Review	14 Days [c]
7. CT Review	7 Days
8. OC Review	7 Days
9. Issue Final Amendments / RFIs	Complete

Duration periods vary from project to project. Confirm schedule with the Project Manager*

This Bidder RFI and Amendment Schedule is included in the Bidder RFI LIR meeting invite.

Notes:

a. **Event:** Refer to the Process Flowchart (slide 2) for descriptions of each event.

b. **Initial RFI Responses Due and Initial Amendment Documents Due:** To facilitate TL and TS bidder RFI response review, PDT/DOR shall submit initial bidder RFI responses within 7 days of the Bidder RFI LIR. Amended documents should be submitted 7 days after the initial bidder RFI responses are provided.

c. **Engineering QA (TL & TS) Review:** TL and TS may conduct their reviews of bidder RFI responses concurrently. TS will only review bidder RFI responses marked “Yes” in the “TL QA Reviewed” column of the bidder RFI spreadsheet.

AMENDMENT PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

AMENDMENT FORMATTING - DRAWINGS

Amendment Procedures

1. Prior to making any new revisions, remove all prior cloud revision bubbles, but leave all numbered delta symbols.

2. Utilize cloud revision bubbles with a numbered delta symbol to identify each drawing revision.

3. The delta number will be the same on all amended drawing sheets within an amendment package. Add the delta number and a short description of the revision to the list of revisions in the title block of each amended drawing sheet.
   Note: The delta number may not be the same as the amendment number.
   - The amendment number will be provided by JED.
   - The delta number indicates the number of revisions made to the drawing set during the solicitation process.
     Example: AM-0001 included only amended specifications. AM-0002 includes amended drawings. This is the first time drawings are being amended in solicitation. Therefore, delta 1 shall be used to identify each drawing revision within AM-0002.

4. Add a “DELETED” watermark on all deleted drawing sheets.

5. Add “AM-000X” to the bottom right footer of **ALL** amended (revised, added, and deleted) drawing sheets.

6. Provide Tech Services with a single, bookmarked .pdf file with all amended (revised, added, and deleted) drawing sheets. This file shall not exceed 100MB.

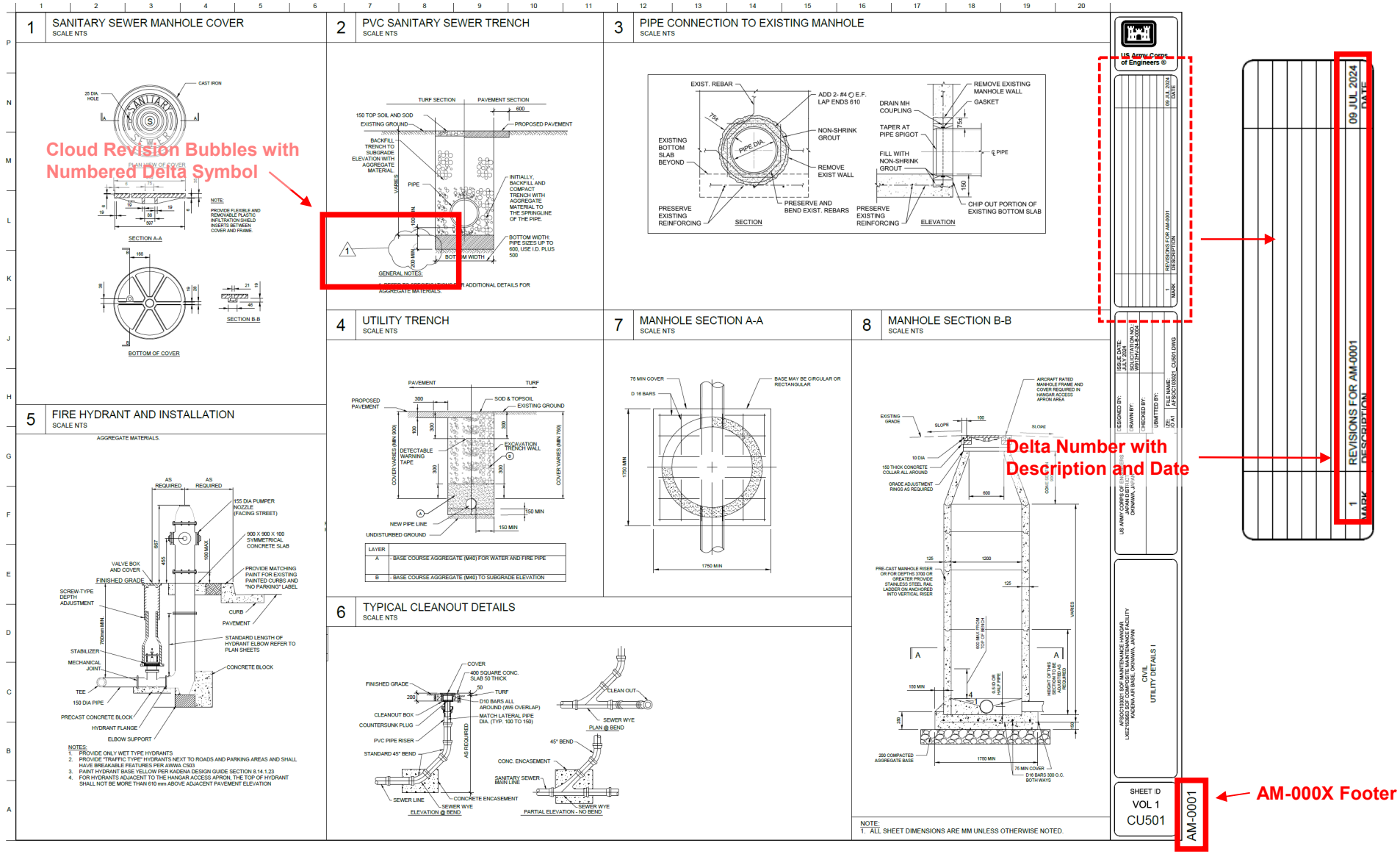
AMENDMENT PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

AMENDMENT FORMATTING – DRAWINGS (Single Revision)

For Example Purposes Only



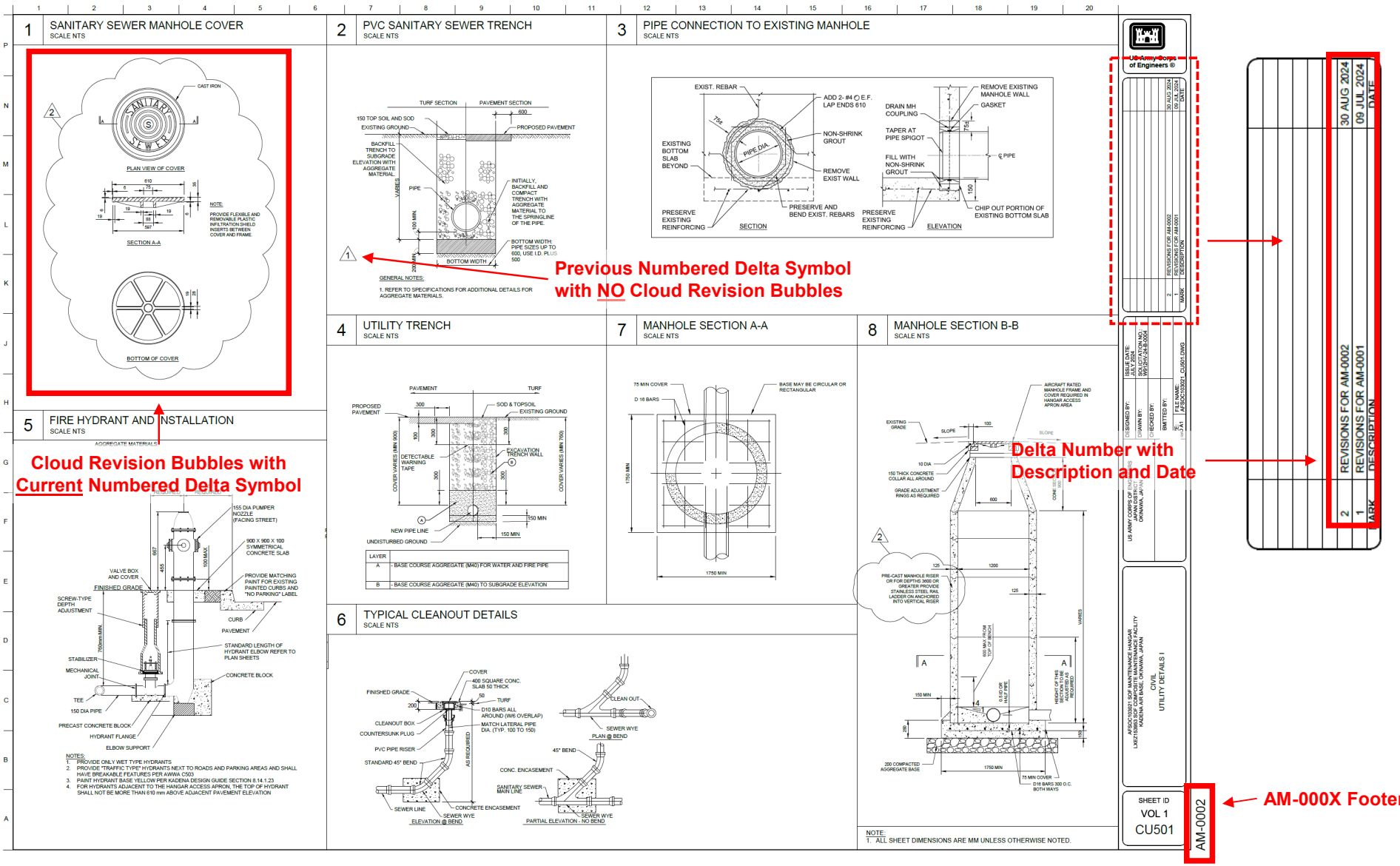
AMENDMENT PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

AMENDMENT FORMATTING – DRAWINGS (Multiple Revisions)

For Example Purposes Only



AMENDMENT PROCESS

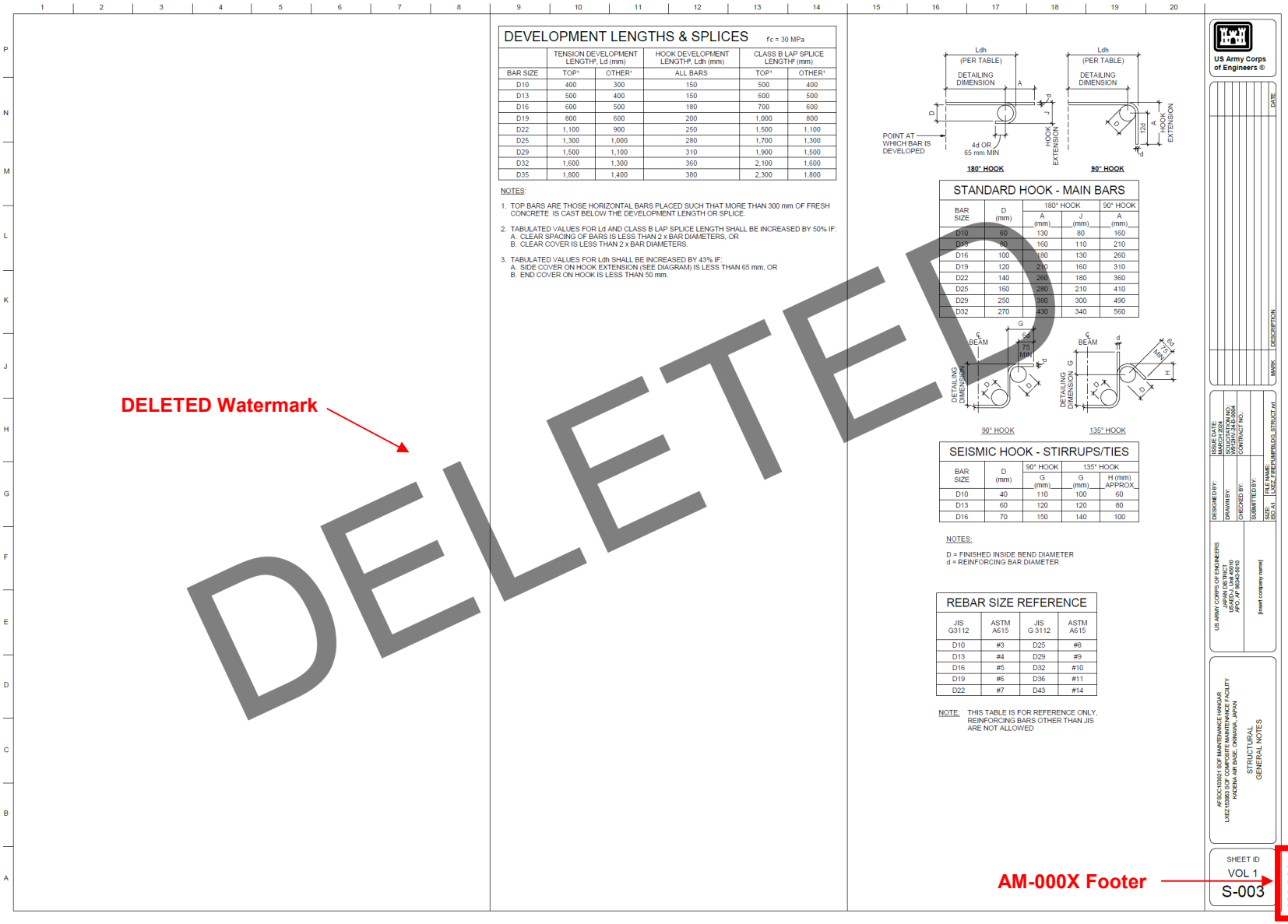
JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

AMENDMENT FORMATTING – DRAWINGS (Deleted)

For Example Purposes Only

DELETED Watermark



AM-000X Footer

AMENDMENT PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

AMENDMENT FORMATTING - SPECIFICATIONS

Amendment Procedures

A. General:

1. SpecsIntact:
    a) Archive .sec files for back up purposes.
    b) Execute revisions in all specification sections prior to making new revisions.
    c) Ensure the headers and footers match the Contracting issued RTA set. Replace the “RTA” bottom right footer with “AM-000X” for the entire specification section or attachment.
    d) For specification sections that were included in previously issued amendment packages, unbold and remove underlines from previous revisions.
    e) Turn on revisions/track changes (~~TXT~~).
        i. Deletions shall be ~~strikethrough~~.
        ii. Additions shall be **bold and underlined**.
    f) If there are any revisions to submittals, compile a new submittal register. Add the appropriate specification attachment headers and footers to the submittal register (i.e. Attachment 01 33 00-B)

2. Revise the specifications table of contents if specification sections and/or attachments are added or deleted.

3. Add red lines in the left margin of the .pdf file to track all revisions in each amended specification section and amended specification attachment.

4. Provide Tech Services with all revised .sec files and a single, bookmarked .pdf file with all amended (revised, added, and deleted) specification sections, specification attachments, and table of contents, as applicable. This file shall not exceed 100MB.

B. Paragraph Revisions:

1. Deleted paragraphs shall be marked "NOT USED" to keep the original numbering of specification paragraphs. Paragraphs shall not be renumbered when making deletions in an amendment.

2. Add new paragraphs to the end of a specification section or part to keep the original numbering of the specification paragraphs.

C. New Specification Sections

1. Red lines in the left margin and revision tracking (i.e. bold and underlined) is not necessary.

D. Deleted Specification Sections

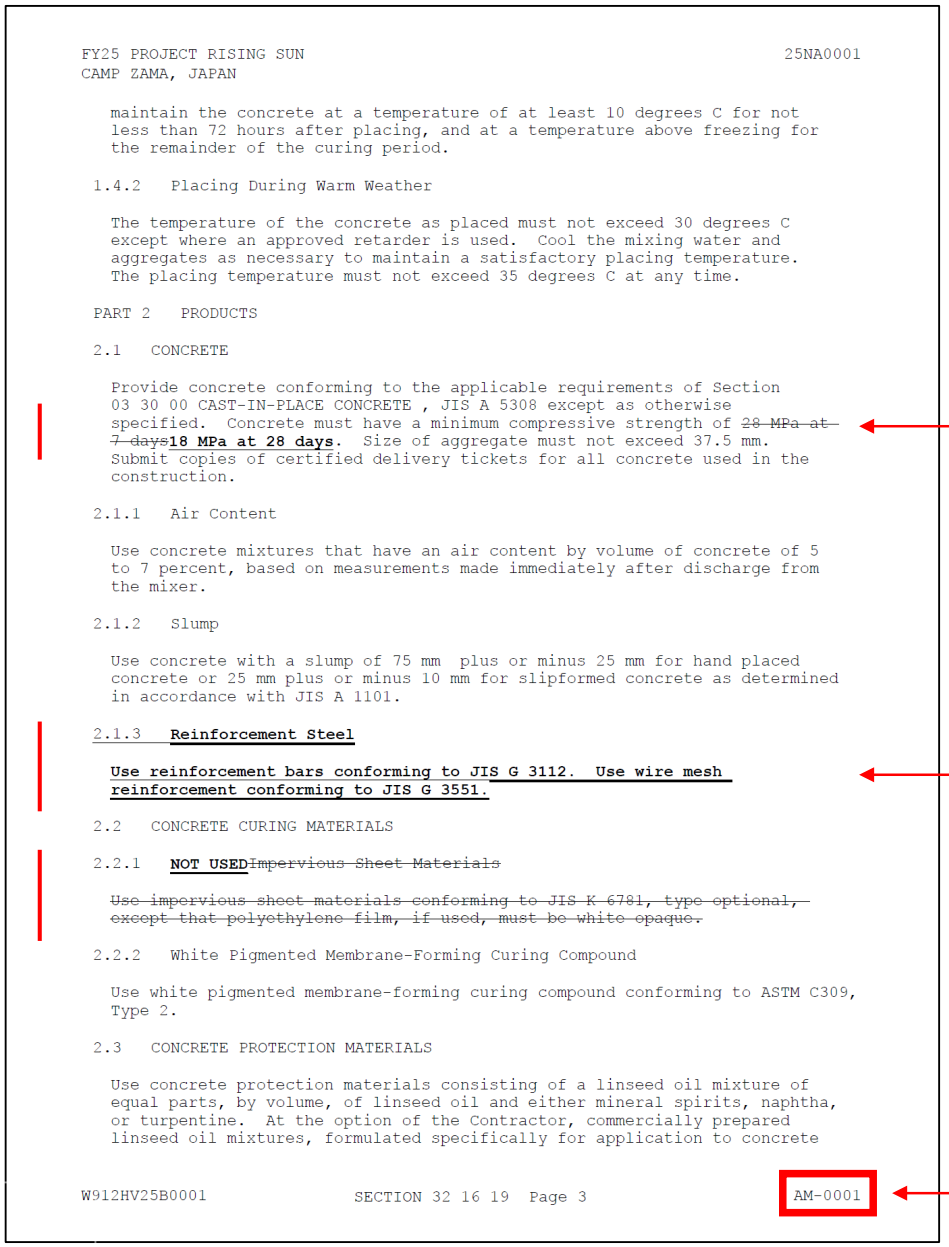
1. In the single, bookmarked .pdf specifications file, provide only the first page of the deleted specification section and add “THIS SPECIFICATION SECTION IS DELETED IN ITS ENTIRETY (AM-000X)”.

AMENDMENT PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

AMENDMENT FORMATTING - SPECIFICATIONS



FY25 PROJECT RISING SUN 25NA0001
CAMP ZAMA, JAPAN

maintain the concrete at a temperature of at least 10 degrees C for not less than 72 hours after placing, and at a temperature above freezing for the remainder of the curing period.

1.4.2 Placing During Warm Weather

The temperature of the concrete as placed must not exceed 30 degrees C except where an approved retarder is used. Cool the mixing water and aggregates as necessary to maintain a satisfactory placing temperature. The placing temperature must not exceed 35 degrees C at any time.

PART 2 PRODUCTS

2.1 CONCRETE

Provide concrete conforming to the applicable requirements of Section 03 30 00 CAST-IN-PLACE CONCRETE , JIS A 5308 except as otherwise specified. Concrete must have a minimum compressive strength of ~~28 MPa at 7 days~~**18 MPa at 28 days**. Size of aggregate must not exceed 37.5 mm. Submit copies of certified delivery tickets for all concrete used in the construction.

2.1.1 Air Content

Use concrete mixtures that have an air content by volume of concrete of 5 to 7 percent, based on measurements made immediately after discharge from the mixer.

2.1.2 Slump

Use concrete with a slump of 75 mm plus or minus 25 mm for hand placed concrete or 25 mm plus or minus 10 mm for slipformed concrete as determined in accordance with JIS A 1101.

2.1.3 **Reinforcement Steel**

Use reinforcement bars conforming to JIS G 3112. Use wire mesh reinforcement conforming to JIS G 3551.

2.2 CONCRETE CURING MATERIALS

2.2.1 **NOT USED**~~Impervious Sheet Materials~~

~~Use impervious sheet materials conforming to JIS K 6781, type optional, except that polyethylene film, if used, must be white opaque.~~

2.2.2 White Pigmented Membrane-Forming Curing Compound

Use white pigmented membrane-forming curing compound conforming to ASTM C309, Type 2.

2.3 CONCRETE PROTECTION MATERIALS

Use concrete protection materials consisting of a linseed oil mixture of equal parts, by volume, of linseed oil and either mineral spirits, naphtha, or turpentine. At the option of the Contractor, commercially prepared linseed oil mixtures, formulated specifically for application to concrete

W912HV25B0001 SECTION 32 16 19 Page 3 AM-0001

Red Line to Track Revisions

Deleted Text (~~Strikethrough~~)
Added Text (**Bold** and Underlined)

New paragraphs added at the end of a specification section to keep the original paragraph numbering

Deleted paragraphs marked "NOT USED" to keep the original numbering of paragraphs

"AM-000X" Added to Footer

For Example Purposes Only

AMENDMENT PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

AMENDMENT FORMATTING – SPECIFICATIONS (DELETED SPEC SECTION)

For Example Purposes Only

FY25 PROJECT RISING SUN
CAMP ZAMA, JAPAN

25NA0001

SECTION 02 81 00

TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS

THIS SPECIFICATION SECTION IS DELETED IN ITS ENTIRETY (AM-0001)

Provide only the first page of the deleted specification section with this note added

W912HV25B0001 SECTION 02 81 00 Page 1 AM-0001

"AM-000X" Added to Footer

AMENDMENT PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

AMENDMENT FORMATTING – AS-BUILTS DRAWINGS

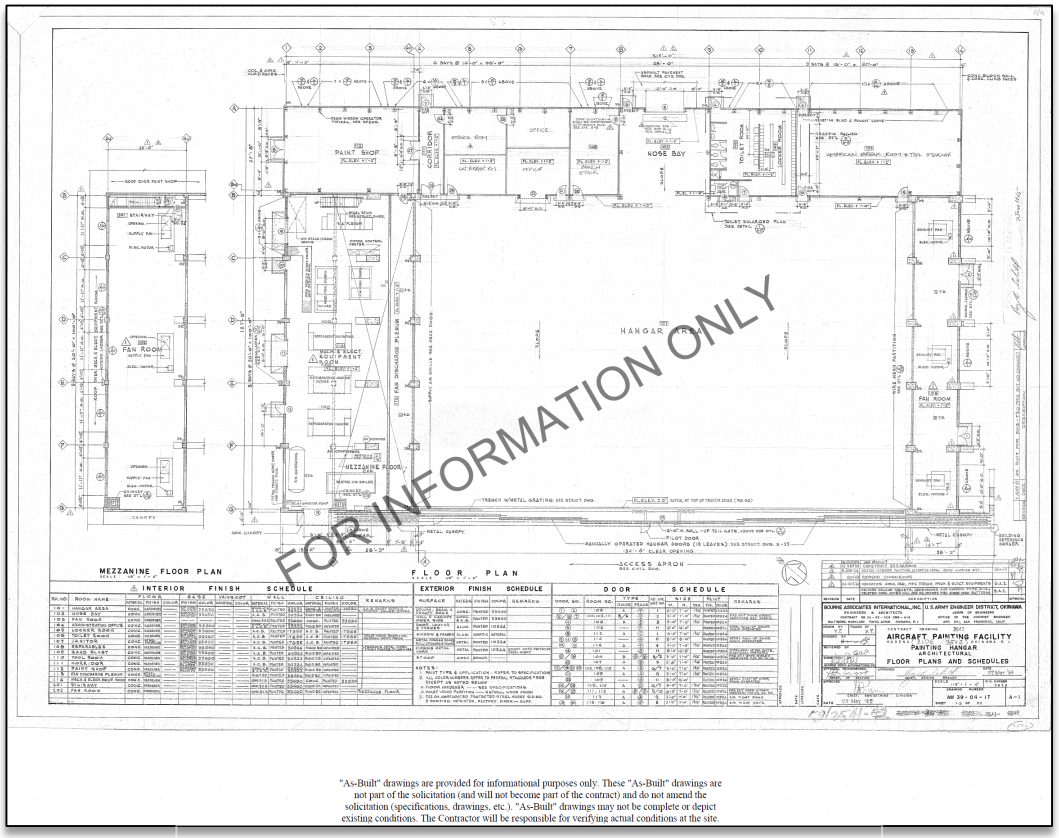
Amendment Procedures:

1. Provide Tech Services with a single, bookmarked .pdf file of all as-built drawings. This file shall not exceed 100MB.

2. Add a “FOR INFORMATION ONLY” watermark on all as-built drawings.

3. Add the FIO disclaimer in the footer of only the first page of the single, bookmarked .pdf file:
   "As-Built" drawings are provided for informational purposes only. These "As-builts" drawings are not part of the solicitation (and will not become part of the contract) and do not amend the solicitation (specifications, drawings, etc.). "As-builts" drawings may not be complete or depict existing conditions. The Contractor will be responsible for verifying actual conditions at the site.

4. Bidder RFI Spreadsheet: Utilize the standard bidder RFI response for as-builts.



For Example Purposes Only

AMENDMENT PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

AMENDMENT FORMATTING – PHOTOS

Amendment Procedures:

1. Provide Tech Services with a single, bookmarked .pdf file of all photos. This file shall not exceed 100MB.

2. Add a “FOR INFORMATION ONLY” watermark on all photos.

3. Add the FIO disclaimer in the footer of only the first page of the single, bookmarked .pdf file :
   Photos are provided for informational purposes only. These photos are not part of the solicitation (and will not become part of the contract) and do not amend the solicitation (specifications, drawings, etc.).

4. Bidder RFI Spreadsheet: The bidder RFI response shall be similar to the standard response for as-builts.

For Example Purposes Only

AMENDMENT PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (EDS) – Technical Services

AMENDMENTS – SF-30 FORM

Amendment Procedures:

1. A SF-30 form is required to be submitted with each amendment package. Tech Services will provide a template SF30 .docx file.
2. Edit or delete all red text as applicable to amendment package.

For Example Purposes Only

14. DESCRIPTION OF AMENDMENT (continued)

A. CHANGES TO SPECIFICATIONS – The amendment mark "(AM-000X)" is shown on each page of the amended specification section(s).

(1) Revised Section(s) and Revised Section Attachment(s) to Project Specifications. Attached hereto are the following revised section(s) and revised section attachment(s) to the specifications. Revised section(s) replace like numbered section(s) in the subject solicitation specifications, though some existing section attachment(s) pertaining to these sections remain in effect, as identified below. Revised attachment section attachment(s) replace like-numbered section (s) in the subject solicitation specifications. Changes are indicated by a red line in the left margin of revised areas. All portions of the revised section(s) and revised section attachment(s) shall apply whether or not changes have been indicated.

Revised Section(s): (None)
Section 00 00 00 (existing Attachment 00 00 00-A remains in effect and is not attached to this Amendment)

Revised Attachment(s): (None)
Attachment 00 00 00-B

(2) Added Section(s). The following section(s) are attached hereto and added to the specifications:

Added Section(s): (None)
Section 00 00 00

(3) Deleted Section(s). The following section(s) are deleted entirely from the specifications:

Deleted Section(s): (None)
Section 00 00 00

B. CHANGES TO DRAWINGS (ISSUED) – The amendment mark "(AM-000X)" is shown on each sheet of the amended drawing sheet(s).

(1) Revised Sheet(s) to Drawings. Attached hereto are the following revised sheets to the drawings. Revised sheets will replace like-numbered sheets in the subject solicitation drawings. Changes are indicated in revision clouds. All portions of the revised sheet(s) shall apply whether or not changes have been indicated.

Revised Sheet(s) to Drawing: (None)
E-000

(2) Added Sheet(s) to Drawings. Attached hereto are the following added sheets to the drawings:

Added Sheet(s) to Drawings: (None)
E-000

(3) Deleted Sheet(s). The following sheet(s) are deleted entirely from the drawings:

IFB/RFP No. W912HV-XX-X-00XX
SF 30 Continuation Page
AM-000X

Deleted Sheet(s) to Drawings: (None)
E-000

C. All questions and the Government responses regarding this solicitation are to be viewed through the web-based program "Bidder Inquiry Module". This program is located on the internet and can be accessed at https://www.projnet.org/projnet. Answers provided to the respective questions through the ProjNet do not amend the solicitation (specifications, drawings, etc.) unless revision to the specifications or drawings is specifically noted and incorporated into the solicitation via an amendment.

D. "As-Built" drawings are provided for informational purposes only. These "As-builts" drawings are not part of the solicitation (and will not become part of the contract) and do not amend the solicitation (specifications, drawings, etc.). "As-builts" drawings may not be complete or depict existing conditions. The contractor will be responsible for verifying actual conditions at the site.

E. SITE VISIT PHOTOS (FOUO) - The attached photos were taken at the site visit. The photos are for informational purposes only. The photos are not part of the solicitation (and will not become part of the contract) and do not amend the solicitation (specifications, drawings, etc.).

F. The bid/proposal due date and time is unchanged.

U.S. ARMY

US Army Corps of Engineers®

CONFORMED SET PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (ESB) – Technical Services

CREATED: NOV 2023

Updated: APR 2025

CONFORMED SET PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (ESB) – Technical Services

CONFORMED SET PACKAGE

Conformed Set Package Includes:

- Conformed Set Drawings* (combined in a single, bookmarked .pdf file) – bookmarks shall match the drawing index
- Conformed Set Specifications* (combined in a single, bookmarked .pdf file) – bookmarks shall match the specifications table of contents
- All native drawings (.dwg) and specification (.sec) files (w/tracked revisions from amendments, if applicable)

**Conformed Set Drawings and Conformed Set Specifications .pdf files shall not exceed 100MB each.*

CONFORMED SET = Ready to Advertise (RTA) Package + Amendments

CONFORMED SET - Issued to Successful Contractor (Post-Award). NOT Contractual, provided as a courtesy to Contractors.

Conformed Set Procedures:

A. General:

1. The conformed set .pdf files shall comprise of the final version of each individual specification section and drawing plans, as finalized at RTA or revised via amendment. Furthermore, the conformed set shall be updated as detailed in steps 5 and 6 below. No other changes shall be made to the plans or specifications.
2. RTA drawing sheets and specification sections are to be replaced with amended drawing sheets and specification sections to create the conformed set.
3. The conformed set drawings and specifications shall contain all amendments issued during solicitation.
4. If there are multiple amendments to the same drawing sheet or specification section, the latest amended version is to be included in the conformed set.
   - For the .sec and .dwg native files, if multiple amendments were issued for the same specification section or drawing, please submit only the native file from the latest amendment.
5. Add the conformed set header to **ALL** pages of the conformed set drawings and specifications .pdf files **ONLY**. This header is not needed on the native files. Note: JED will provide the construction contract number and task order number (if applicable).
   i. **Header for IFB and RFP Contracts:**
      CONFORMED SET; CONTRACT AWARD NO. W912HVXXC00XX
   ii. **Header for MATOC Contracts:**
      CONFORMED SET; CONTRACT AWARD NO. W912HVXXD00XX, TASK ORDER NO. W912HVXXF00XX
6. Except as noted below, drawings and specification sections **not amended** during solicitation are to have original RTA markings.
   - Update the conformed set drawing cover sheet to add the contract number and award date (MMM YYYY).
   - Update the conformed set specifications cover sheet to add the contract number and award date (MMM YYYY). Utilize the specifications cover sheet template that is provided with the Japan Edited Specifications .sec files online (*https://www.poj.usace.army.mil/Business-With-Us/References/*).
   - Ensure the conformed set specifications Table of Contents includes all deleted and new specification sections and attachments.

CONFORMED SET PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (ESB) – Technical Services

CONFORMED SET PACKAGE

Conformed Set Procedures (Continued):

B. Added Drawing Sheets and Specification Sections:

1. In the conformed set drawings and specifications .pdf files, insert all added drawings sheet(s) and specification section(s) in the appropriate order (refer to Drawing Index and Specification Table of Contents).
2. Include all added drawing and specification native files in the Conformed Set Package.

C. Deleted Drawing Sheets and Specification Sections:

1. In the conformed set drawings and specifications .pdf files, replace original RTA drawing sheet(s) and specification section(s) with amended, deleted drawings sheet(s) and specification section(s).
2. Do not include deleted drawing and specification native files in the Conformed Set Package.

Conformed Set Review by Tech Services:

1. Submit the conformed set drawings and specifications **.pdf files** for review.
2. Submit the native .dwg and .sec files upon approval of the .pdf drawings and specifications by Tech Services.

If there are further clarifications needed that may not have been addressed in these guidelines, please coordinate with Tech Services.

For Tech Services Only:

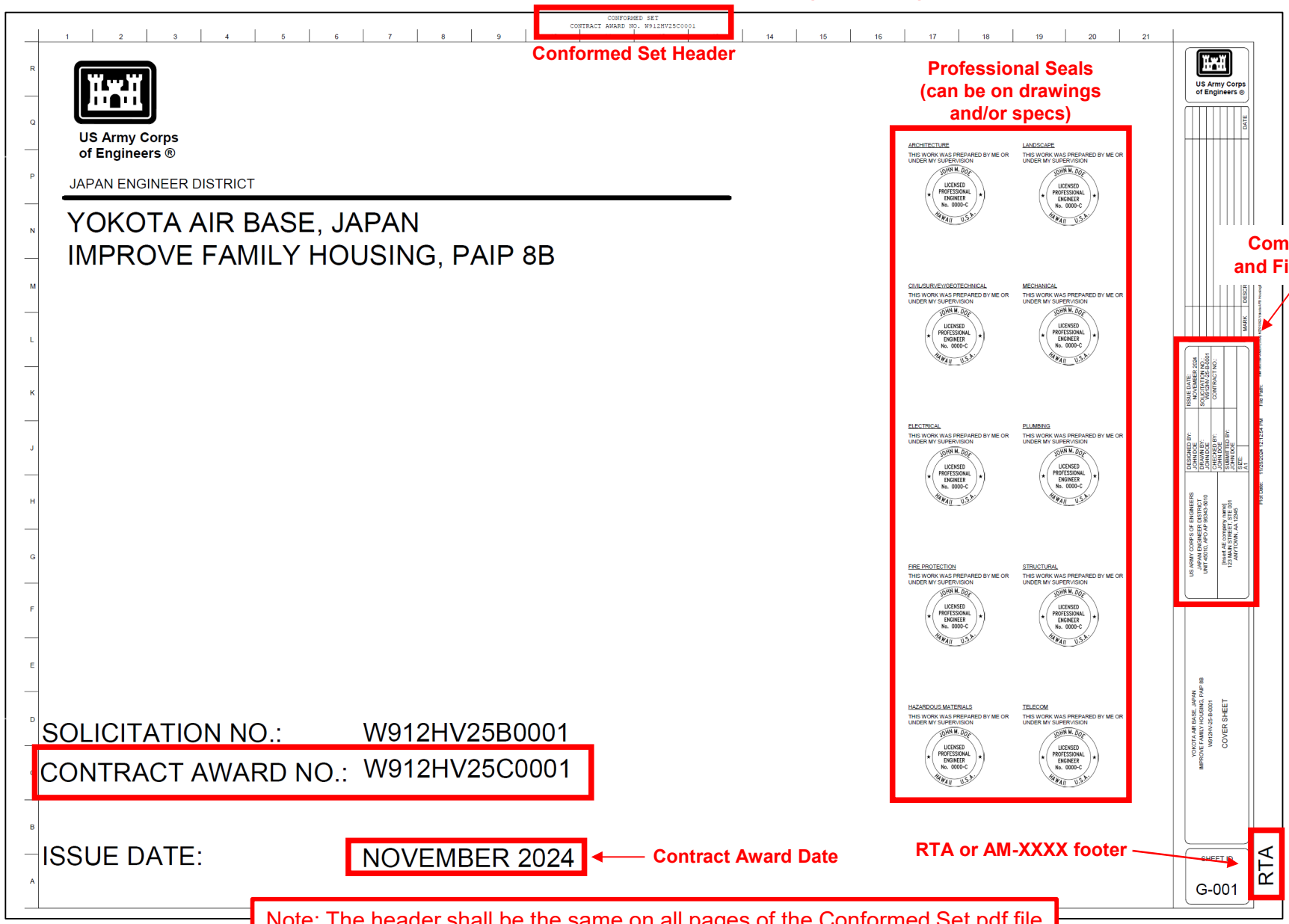
1. Refer to '*Specs Tasks Checklist.xlsx*' for conformed set distribution instructions.

CONFORMED SET PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (ESB) – Technical Services

CONFORMED SET – DRAWINGS (IFB/RFP)



For Example Purposes Only

Note: The header shall be the same on all pages of the Conformed Set pdf file

CONFORMED SET PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (ESB) – Technical Services

CONFORMED SET – DRAWINGS (IFB/RFP)

For Example Purposes Only

CONFORMED SET
CONTRACT AWARD NO. W912HV25C0001

Conformed Set Header

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G-004	PROJECT LOCATION MAPS
G-005	SITE PLANS AND UNIT TYPE
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GI051	LIFE SAFETY CODE ANALYSIS - GOQ
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GI152	LIFE SAFETY FLOOR PLAN - GOQ
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C-001	CIVIL CONSTRUCTION NOTES
C-002	LEGEND AND ABBREVIATIONS
C-003	EROSION CONTROL NOTES
C-004	EROSION CONTROL PLAN - 1 (BUILDING 691)
C-005	EROSION CONTROL PLAN - 2 (BUILDINGS 3287, 3290, 3291)
C-006	EROSION CONTROL DETAILS
C-007	HAUL ROUTE
CD101	DEMOLITION PLAN - 1 (BUILDING 691)
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CS101	SITE PLAN - 1 (BUILDING 691)
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CS104	CLIN0003 (OPTION 2) SITE PLAN (BUILDINGS 3287, 3290 AND 3291)
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AD402	ENLARGED SECOND FLOOR DEMOLITION PLAN - BUILDING 3287 UNITS A AND B
AD403	ENLARGED REFLECTED CEILING DEMOLITION PLAN - BUILDING 3287 UNITS A AND B
AD404	ENLARGED REFLECTED CEILING DEMOLITION PLAN - BUILDING 3287 UNITS A AND B
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A-459	INTERIOR ELEVATIONS KITCHEN
A-460	ENLARGED PLAN AND INTERIOR ELEVATIONS BATHROOM 1
A-461	ENLARGED PLAN AND INTERIOR ELEVATIONS BATHROOM 2
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A-465	ENLARGED PLAN AND INTERIOR ELEVATIONS LINEN AND WALK-IN CLOSET
A-466	ENLARGED PLAN AND SECTIONS GARAGE ADDITION
A-467	ENLARGED PLAN AND SECTIONS EXTERIOR STORAGE
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A-552	EXTERIOR STORAGE - DETAILS
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A-554	WALL-PARTITION TYPE DETAILS
A-555	WALL-PARTITION TYPE DETAILS
A-556	WALL-PARTITION TYPE DETAILS
A-557	WALL-PARTITION TYPE DETAILS
A-558	DOOR DETAILS
A-559	DOOR DETAILS
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P-403	ENLARGED SECOND FLOOR SANITARY WASTE PLANS
P-404	ENLARGED UNDERGROUND DOMESTIC WATER PLANS
P-405	ENLARGED FIRST FLOOR DOMESTIC WATER PLANS
P-406	ENLARGED SECOND FLOOR DOMESTIC WATER PLANS
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P-151	GOQ PLUMBING SANITARY WASTE PLAN
P-152	GOQ PLUMBING DOMESTIC WATER PLAN
P-153	GOQ PLUMBING ROOF PLAN
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P-951	GOQ PLUMBING SANITARY WASTE ISOMETRIC DRAWINGS
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JAPAN ENGINEER DISTRICT

Engineering Support Branch (ESB) – Technical Services

CONFORMED SET – DRAWINGS (MATOC)

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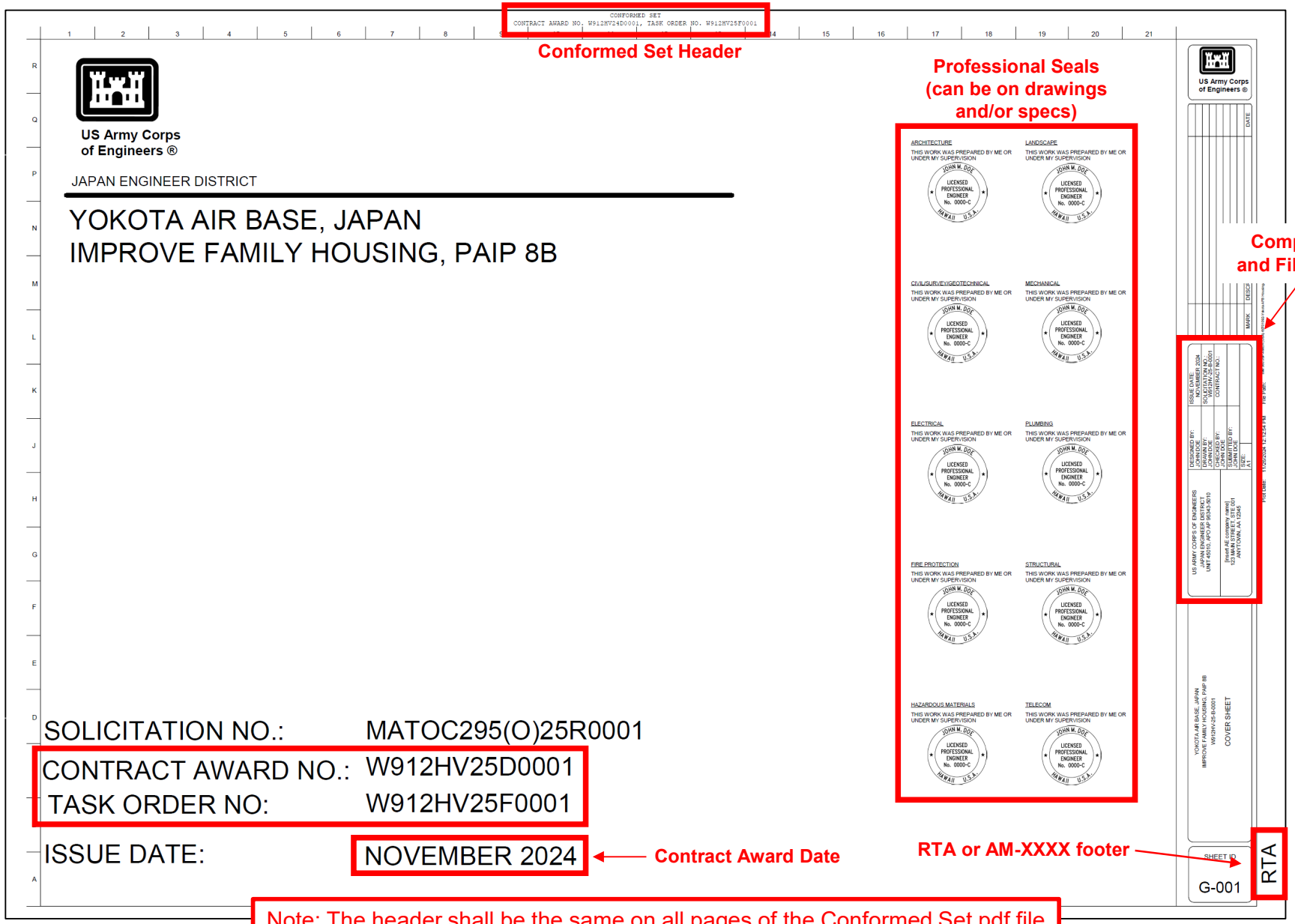

CONFORMED SET PROCESS

JAPAN ENGINEER DISTRICT

Engineering Support Branch (ESB) – Technical Services

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T-403	ENLARGED PLAN - GOQ
GRAND TOTAL SHEETS: 296	

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JAPAN ENGINEER DISTRICT

Engineering Support Branch (ESB) – Technical Services

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CONTRACT AWARD NO. W912HV25C0001

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US Army Corps of Engineers
Japan District

FY25 PROJECT RISING SUN
CAMP ZAMA, JAPAN

SPECIFICATIONS

CONFORMED SET ← **Conformed Set Cover Title**

SOLICITATION NO.: W912HV25B0001
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JANUARY 2025 ← **Contract Award Date**

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CONTRACT AWARD NO. W912HV25C0001

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JAPAN ENGINEER DISTRICT

Engineering Support Branch (ESB) – Technical Services

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FY25 PROJECT RISING SUN
CAMP ZAMA, JAPAN

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SPECIFICATIONS

CONFORMED SET ← **Conformed Set Cover Title**

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CONTRACT AWARD NO.: W912HV24D0001
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