SAE-121029-079-2134B SAMHOON

Structural Design Calculations

FOR

GLASS FRAME & CONNECTIONS

2012. 10.

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B	2013. 02. 04	REVISED AS COMMENT			S. C. LEE
A	2013. 01. 11	REVISED AS COMMENT			S. C. LEE
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C O N T E N T S

1.0 Design Criteria

1.1. Structural Descriptions

a) Purposes : Structural Design Calculations for Glazed Door Frame & Connections

1.2 Structural Material

a) Steel : Galvanized Steel KS D 3506 : Fy = 235 MPa Fu=400MPa

1.3 Design Conditions

Equivalent static design loads for connections of the doorframe to the surrounding walls, hardware, associated connections and glazing stop connections shall be 75 kilopascals (10.8 lbs per square inch) for glazing panels with a vision area less than or equal to 1.0 square meters (10.8 square feet) and 30 kilopascals (4.4 lbs per square inch) for glazing panels with a vision area greater than 1.0 square meters (10.8 square feet) but less than or equal to 3.0 square meters (32 square feet). Loads shall be applied to the surface of the glazing and frame. Connections and hardware may be designed based on ultimate strength for steel.

Total Blast Pressure : H = 75 * 0.4 * 1.4 = 42 kN

Frame Length L = 1.4*2 = 2.8m

w = H/L = 42/2.8 = 15 kN/m (15N/mm)

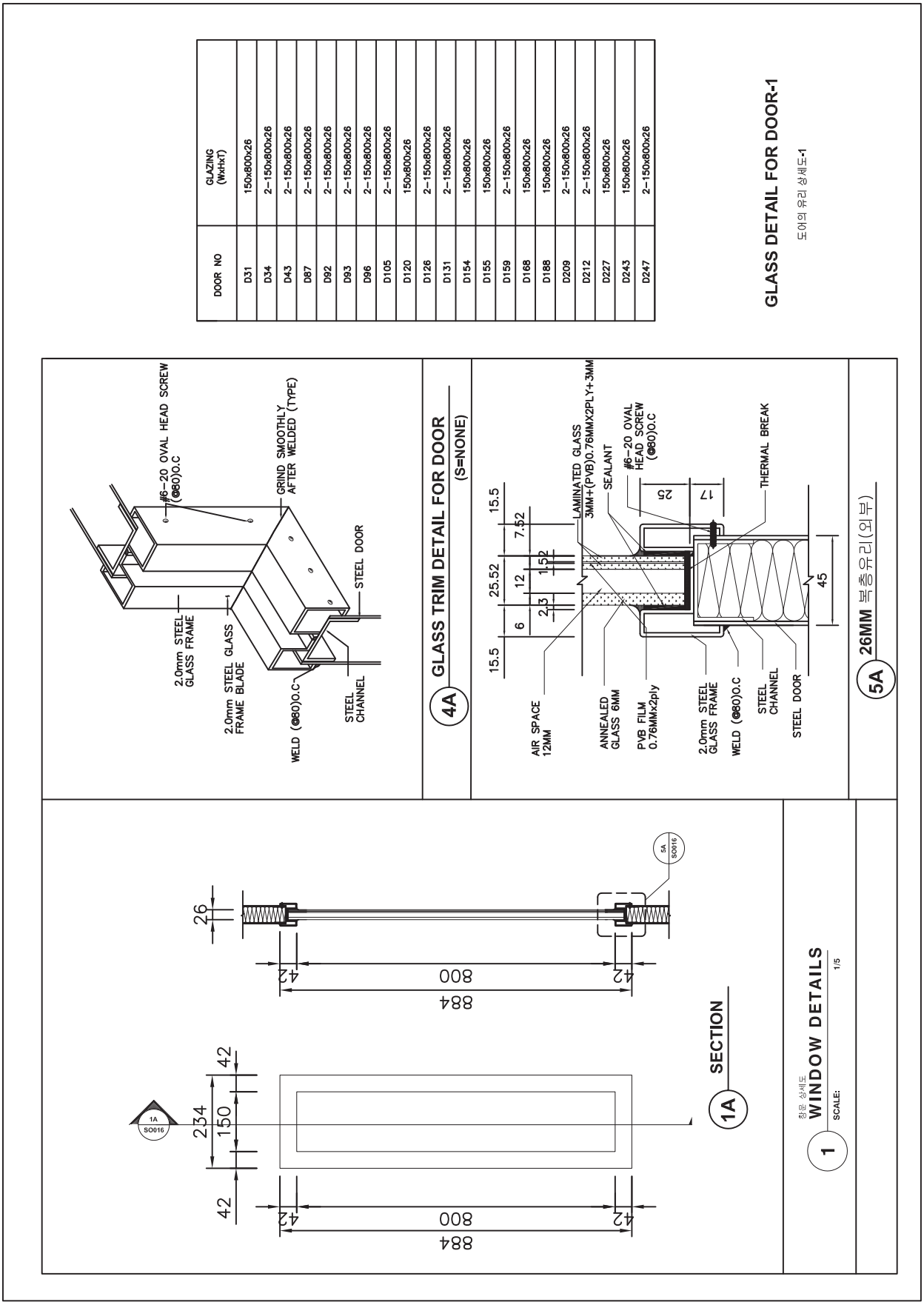
Applicable Nodal Force Ph = 15 * 5mm / 2ea = 37.5 N

1.4 Applicable Design Codes

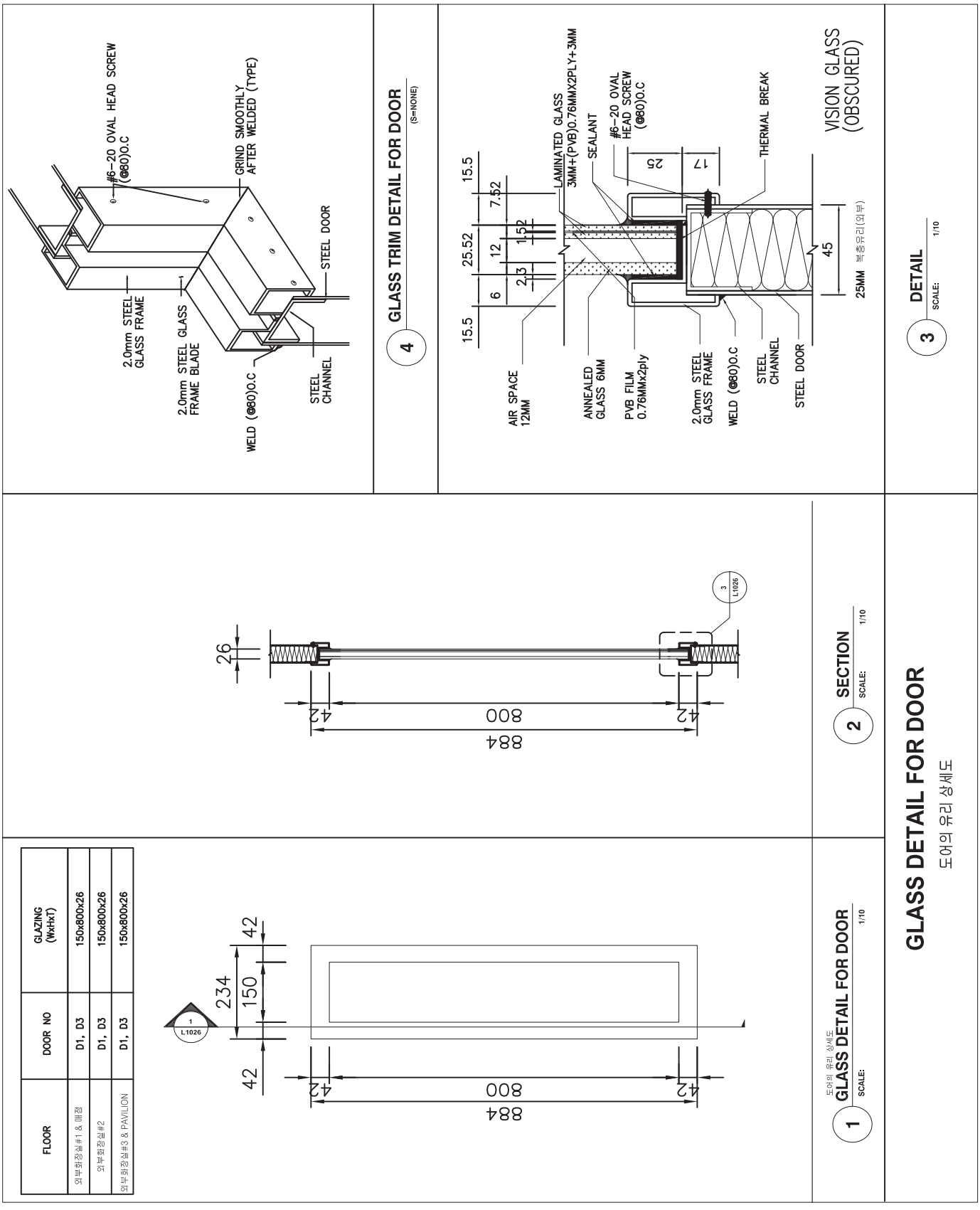
a) Korean Building Codes & Commentary, 2009

1.5 ANALYSIS S/W : MIDAS GEN VER. 795 (Release No. 3)

2.0 DRAWINGS

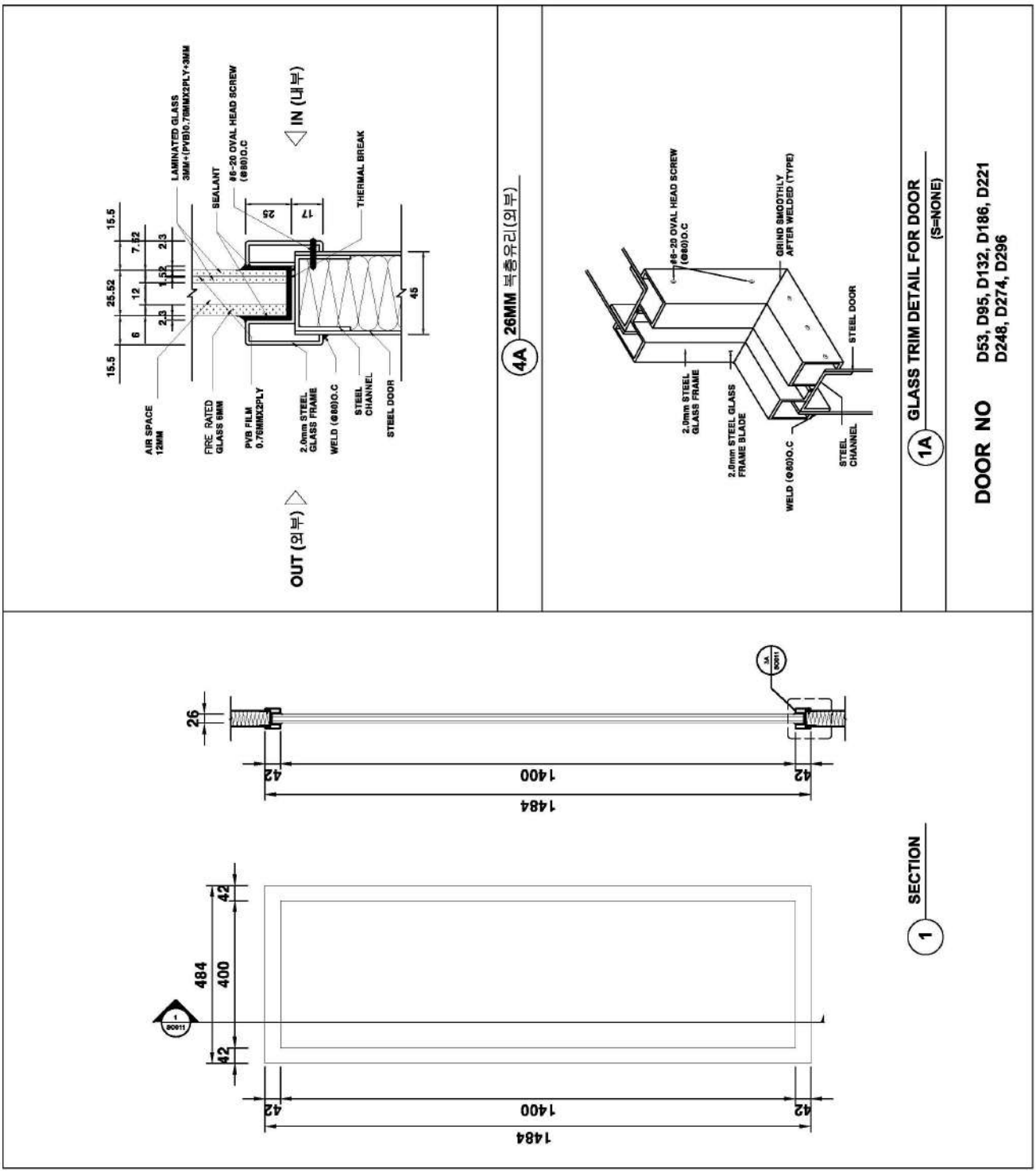

GLASS DETAIL FOR DOOR-1
도어의 유리 상세도-1
DOOR NO
GLAZING (WxHxT)
D31 150x800x26
D34 2-150x800x26
D43 2-150x800x26
D87 2-150x800x26
D92 2-150x800x26
D93 2-150x800x26
D96 2-150x800x26
D105 2-150x800x26
D120 150x800x26
D126 2-150x800x26
D131 2-150x800x26
D154 150x800x26
D155 150x800x26
D159 2-150x800x26
D168 150x800x26
D188 150x800x26
D209 2-150x800x26
D212 2-150x800x26
D227 150x800x26
D243 150x800x26
D247 2-150x800x26
4A GLASS TRIM DETAIL FOR DOOR (S=NONE)
#6-20 OVAL HEAD SCREW (@80)O.C
GRIND SMOOTHLY AFTER WELDED (TYPE)
STEEL DOOR
2.0mm STEEL GLASS FRAME
2.0mm STEEL GLASS FRAME BLADE
WELD (@80)O.C
STEEL CHANNEL
AIR SPACE 12MM
ANNEALED GLASS 6MM
PVB FILM 0.76MMx2ply
LAMINATED GLASS 3MM+(PVB)0.76MMX2PLY+3MM
SEALANT
#6-20 OVAL HEAD SCREW (@80)O.C
THERMAL BREAK
5A 26MM 복층유리(외부)
1A SECTION
1 WINDOW DETAILS
SCALE: 1/5

2.0 DRAWINGS

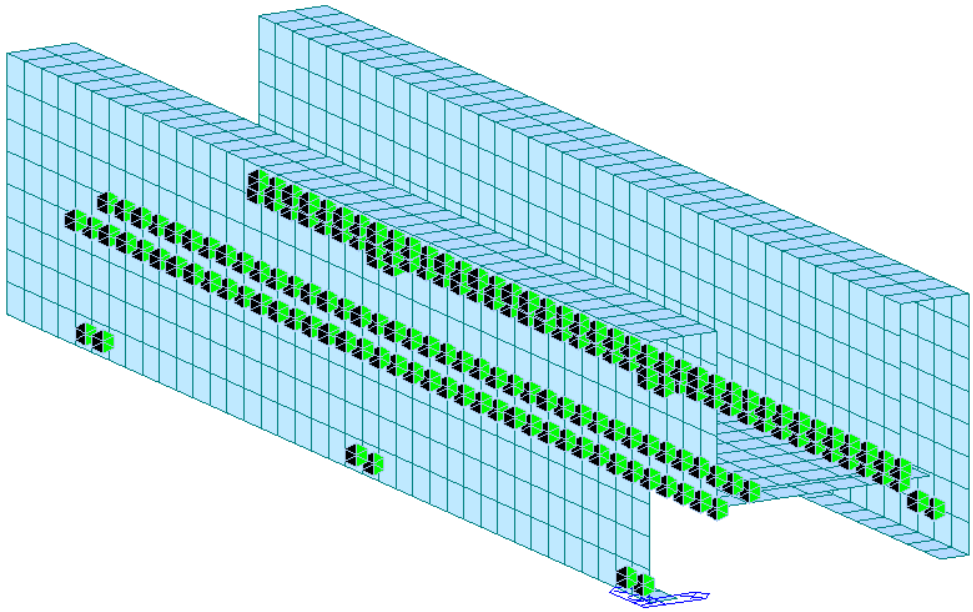


FLOOR	DOOR NO	GLAZING (WxHxT)
외부화장실#1 & 매점	D1, D3	150x800x26
외부화장실#2	D1, D3	150x800x26
외부화장실#3 & PAVILION	D1, D3	150x800x26

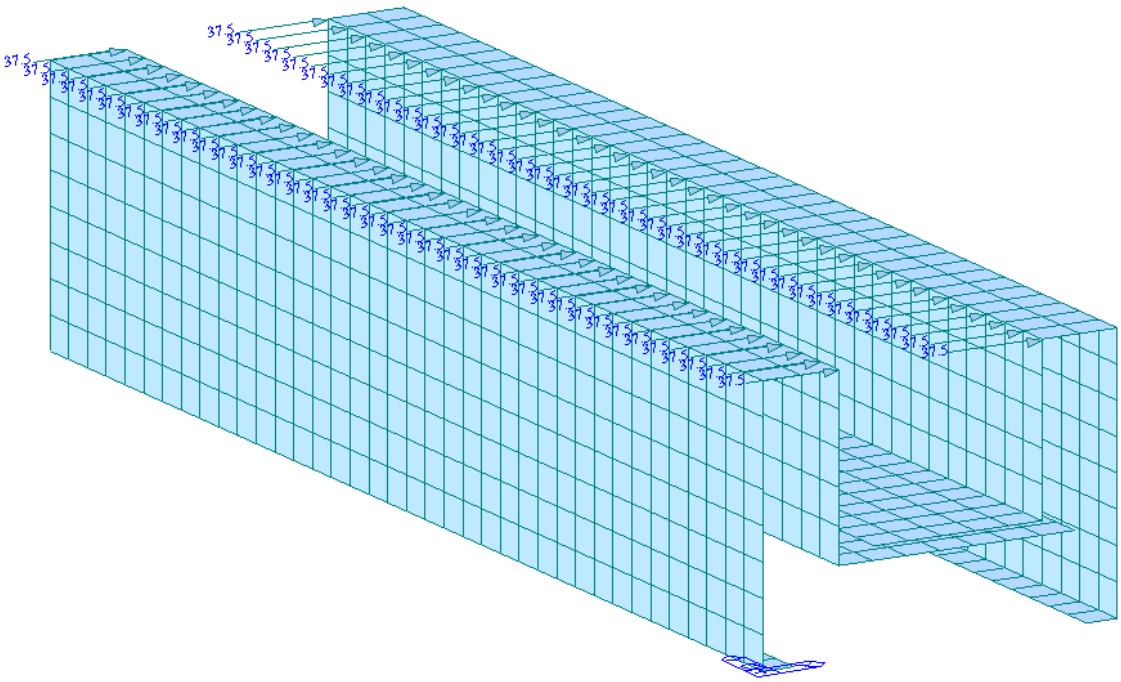
2.0 DRAWINGS


IN (내부)
OUT (외부)
LAMINATED GLASS 3MM+(PVB)0.76MMX2PLY+3MM
SEALANT
#8-2D OVAL HEAD SCREW (@80)O.C
THERMAL BREAK
AIR SPACE 12MM
FIRE RATED GLASS 6MM
PVB FILM 0.76MMX2PLY
2.0mm STEEL GLASS FRAME
WELD (@80)O.C
STEEL CHANNEL
STEEL DOOR
4A 26MM 복층유리(외부)
GRIND SMOOTHLY AFTER WELDED (TYPE)
2.0mm STEEL GLASS FRAME
2.0mm STEEL GLASS FRAME BLADE
1A GLASS TRIM DETAIL FOR DOOR (S=NONE)
DOOR NO D53, D95, D132, D186, D221 D248, D274, D296
1 SECTION

3.0 STRUCTURAL ANALYSIS

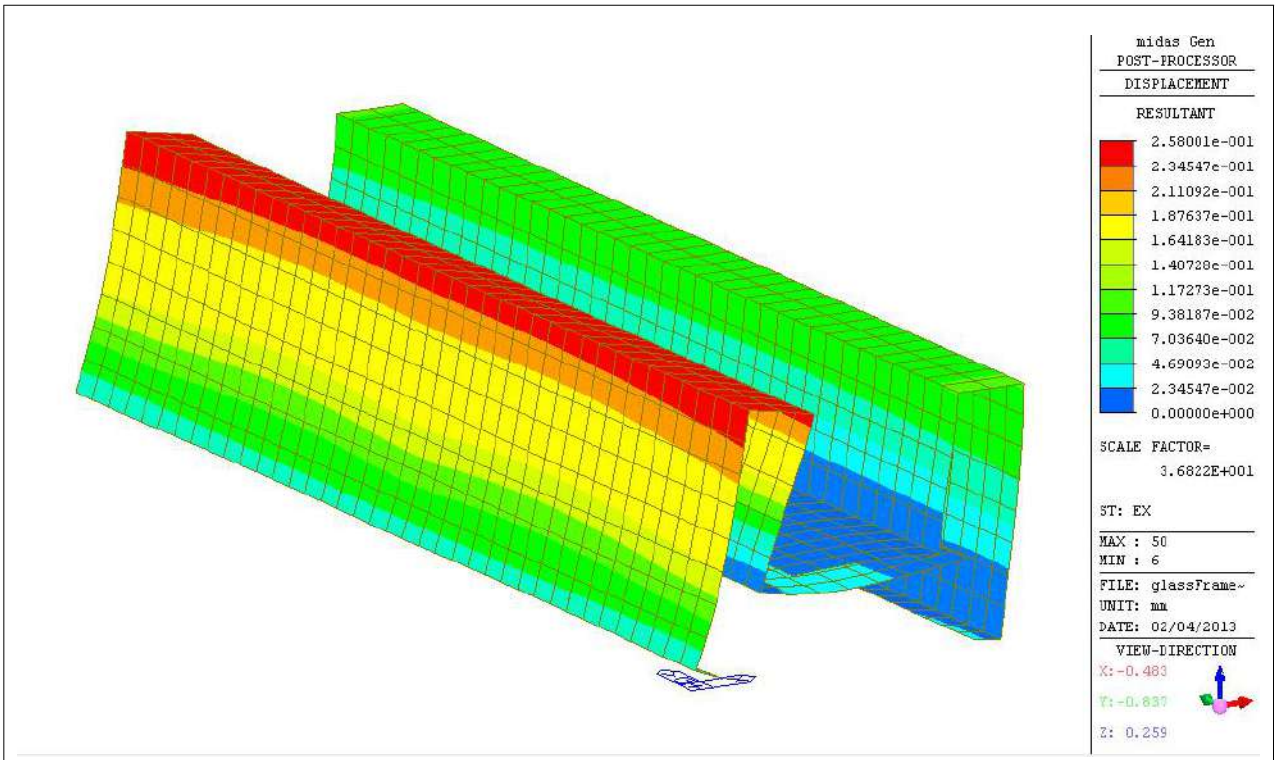


3D MODELLING

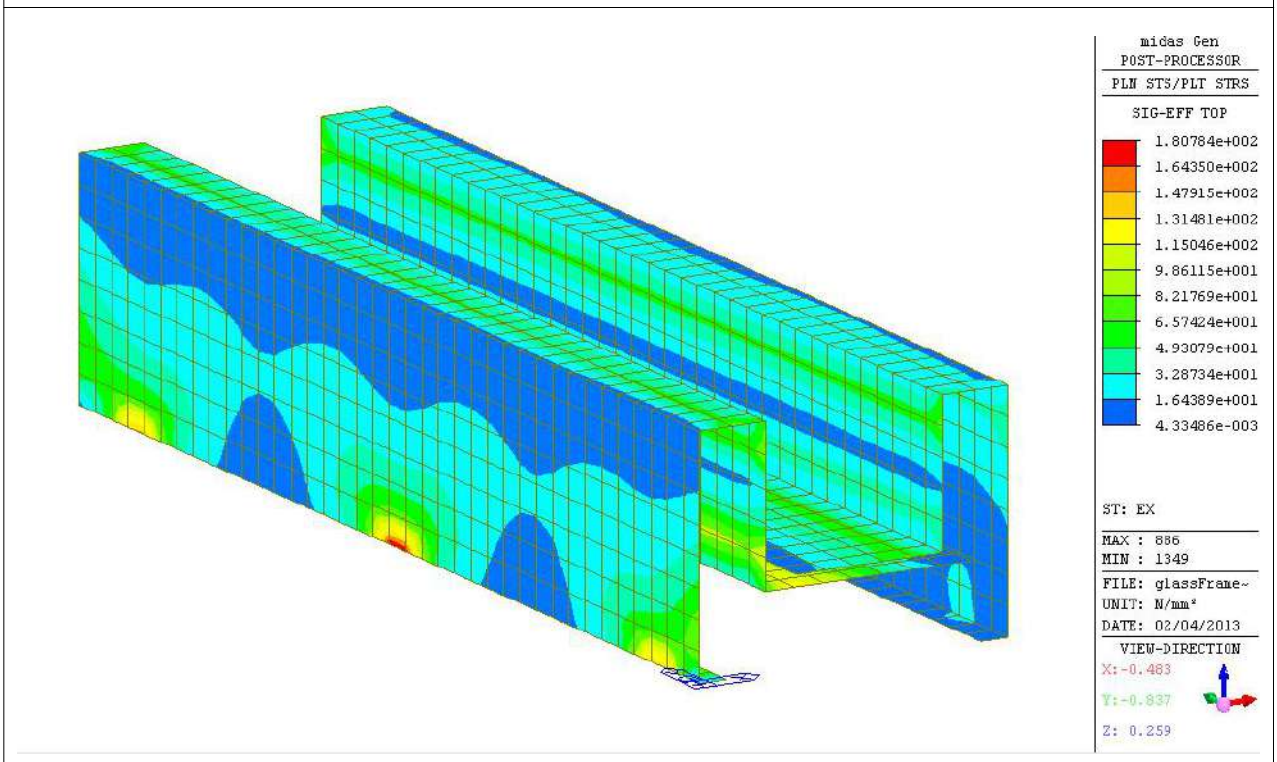


BLAST LOAD

3.0 STRUCTURAL ANALYSIS



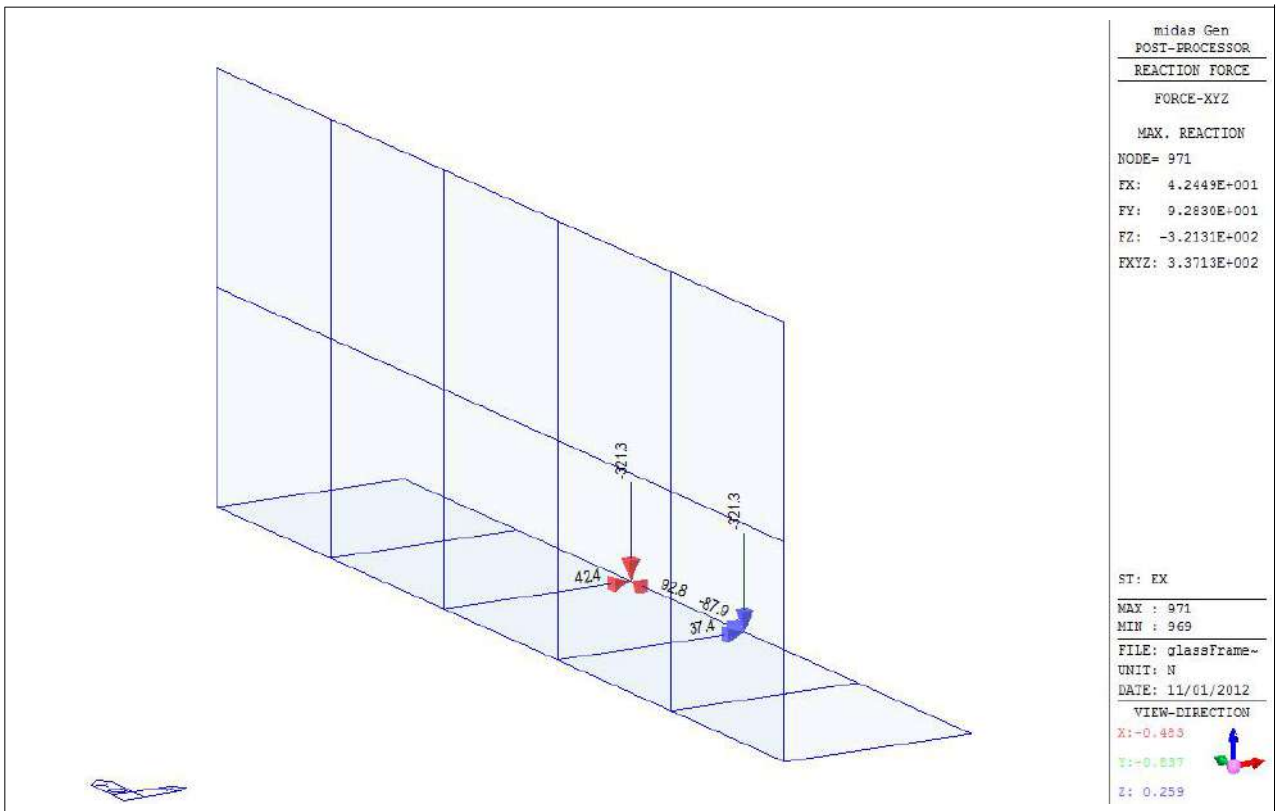
DEFORMATION



STRESS σmax = 180.7 MPa < 235MPa O.K.

4.0 CONNECTION DESIGN

4.1 WELD CONNECTION



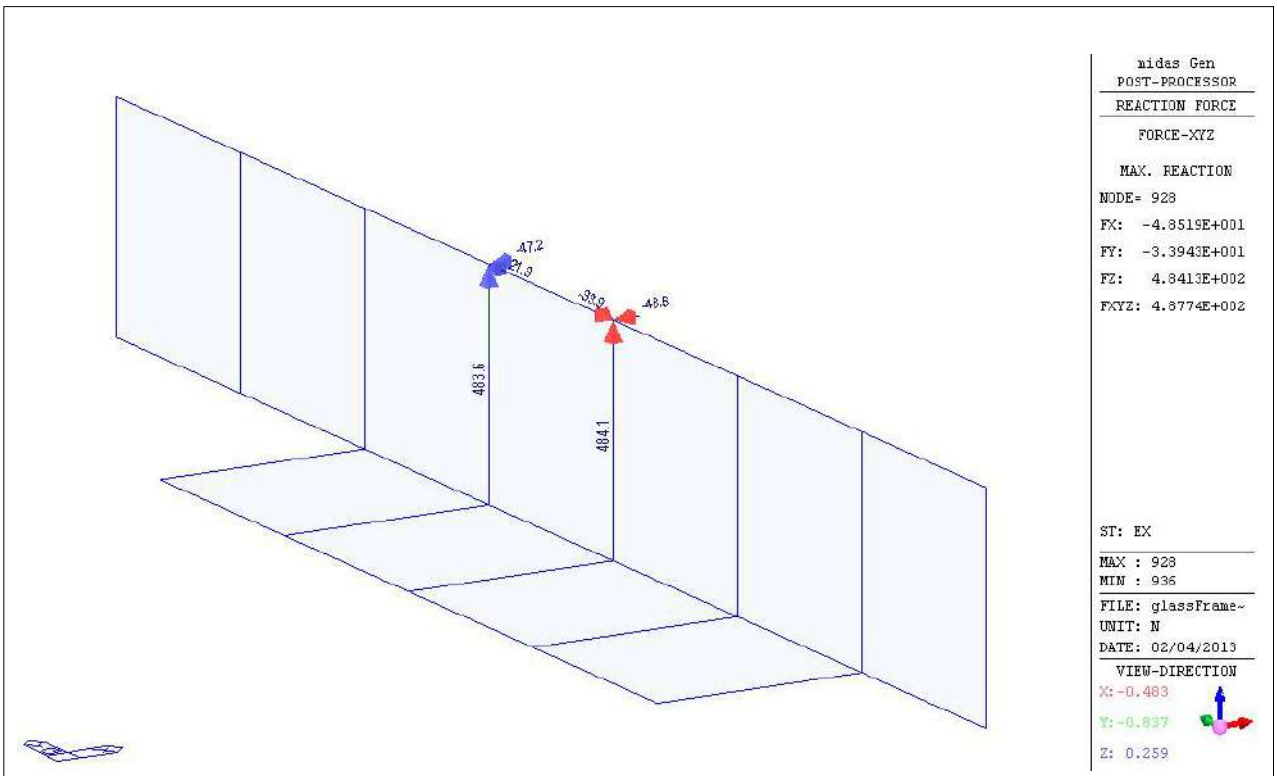
TRY S= 3mm L=10mm @100

Vumax = 321.3*2 = 642.6 N /EA

ΦVn = 0.9 *0.6 * 258 * 0.7 * 3 * (10-2*0.21) = 2802N/ea > Vumax O.K.

USE FILLET WELD S=3 L=10 @100

4.2 SCREW BOLT CONNECTION



TRY Φ6MM SCREW BOLT @80
Vu = 484 * 2 = 968 N/EA
A = 1/4 * 3.14 * 6^2 = 28.26mm^2
ΦVn = 1 * 0.6 * 235 * 28.26 * 3/4= 2988 N/EA > Vu(max) = 968 N O.K.

USE Φ6MM SCREW BOLT @80