Flange connection (Small) Tongue and Groove

Normally a flange connection exist out of two flanges with equal facing.
(FF/FF Flat face, RF/RF Raised face, etc.)

For a Tongue and Groove we have two different flanges;
1x Tongue facing
1x Groove facing

I've made two new flanges in the standard (ASME) fitting catalog.

Action 1:
Create end codes in 3D drawing:
- Open Project
- Open drawing
- give command: <plantendcodes>
- Add: (see Figure 1)
    - End code name: TF
    - Description: Tongue Facing
    - OKE

-Add: Also for:
    - End code name: GF
    - Description: Groove Facing
    - OKE

Result in Figure 2

Action 2:
Create in project settings "Simple Joint Setting":
- Open Project properties
- Plant 3D DWG Settings
- Connections
- Joint Settings
- Simple Joints Add:
    - Joint name : TongueandGroove
    - End 1 <select> : TF
    - End 2 <select> : GF
    - Fasteners <select> : BoltSet, Gasket

Results in Figure 3

Create Compound Joints:
- (Open Project properties)
- (Plant 3D DWG Settings)
- (Connections)
- (Joint Settings)
- Compound Joints Add:
    - Joint name : Auto TG
    - End 1 <select> : TF,GF
    - End 2 <select> : PL,BV, Universal_ET
    - Connection Compound <select> : pipe run component, flange, nom. diameter

Results in Figure 4

Figure 1

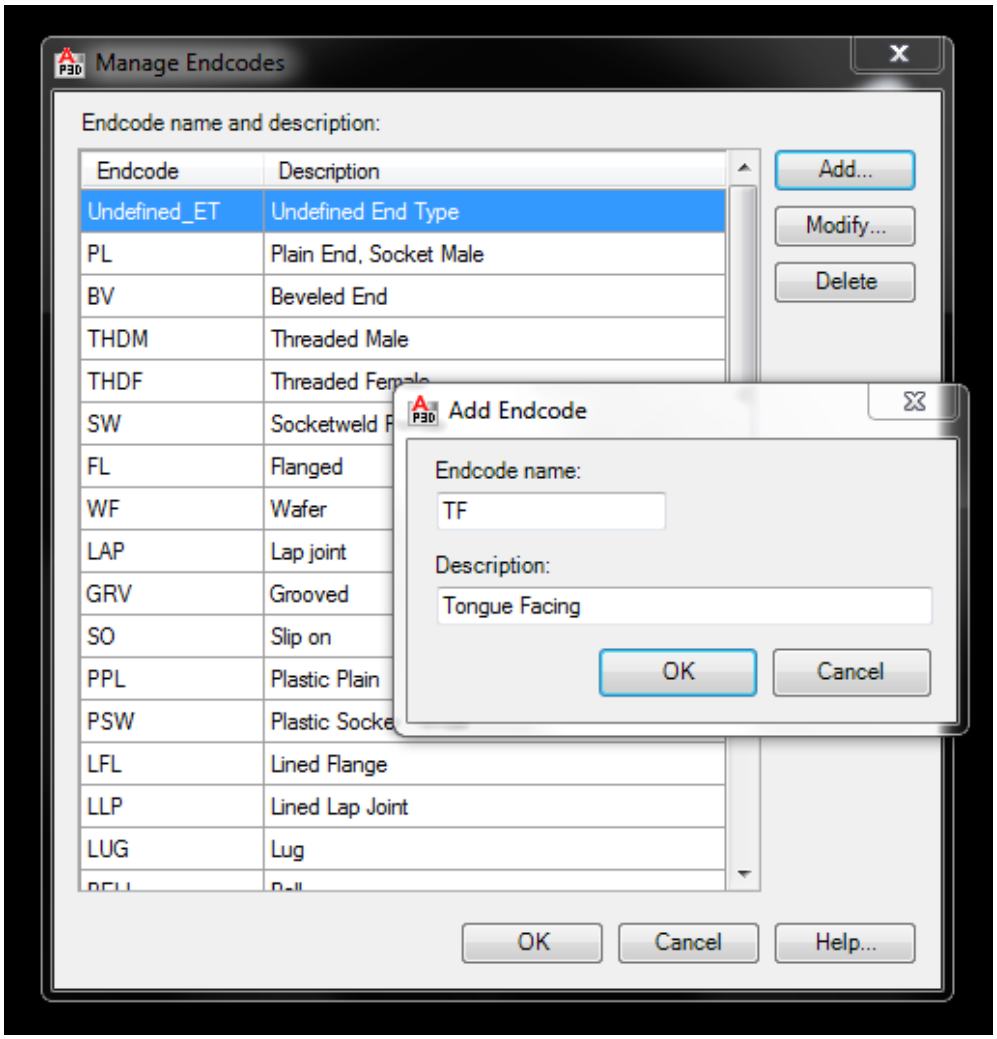

Manage Endcodes
Endcode name and description:
Endcode
Description
Undefined_ET
Undefined End Type
PL
Plain End, Socket Male
BV
Beveled End
THDM
Threaded Male
THDF
SW
FL
Flanged
WF
Wafer
LAP
Lap joint
GRV
Grooved
SO
Slip on
PPL
Plastic Plain
PSW
LFL
Lined Flange
LLP
Lined Lap Joint
LUG
Lug
Add...
Modify...
Delete
OK
Cancel
Help...
Add Endcode
Endcode name:
TF
Description:
Tongue Facing
OK
Cancel

Figure 2

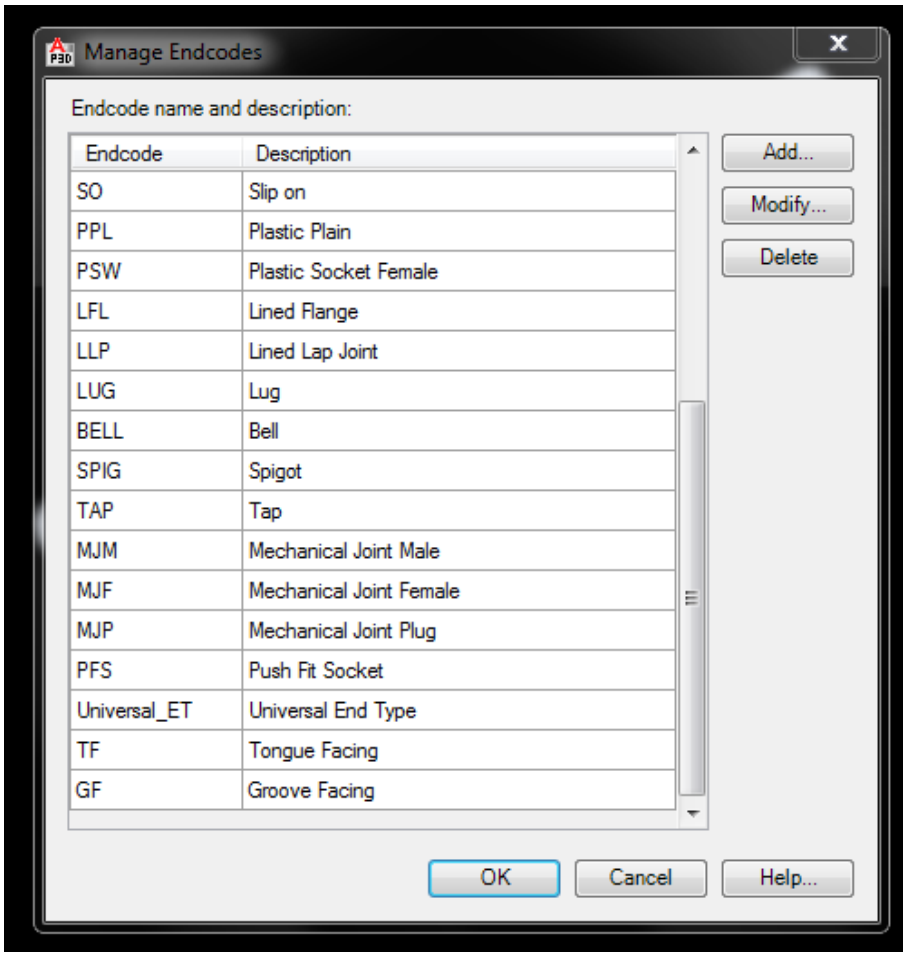

Manage Endcodes
Endcode name and description:
Endcode
Description
SO
Slip on
PPL
Plastic Plain
PSW
Plastic Socket Female
LFL
Lined Flange
LLP
Lined Lap Joint
LUG
Lug
BELL
Bell
SPIG
Spigot
TAP
Tap
MJM
Mechanical Joint Male
MJF
Mechanical Joint Female
MJP
Mechanical Joint Plug
PFS
Push Fit Socket
Universal_ET
Universal End Type
TF
Tongue Facing
GF
Groove Facing
Add...
Modify...
Delete
OK
Cancel
Help...

Figure 3

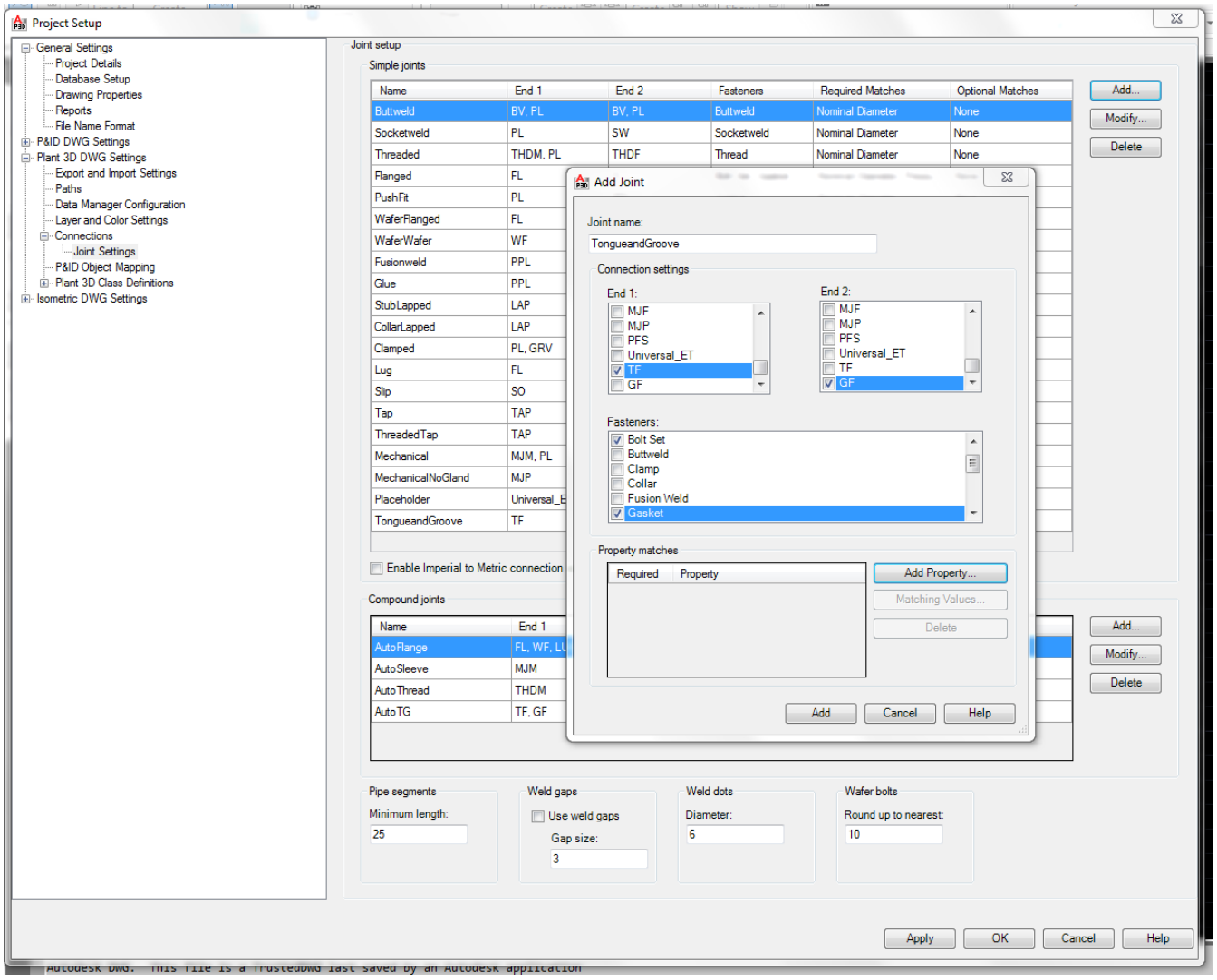
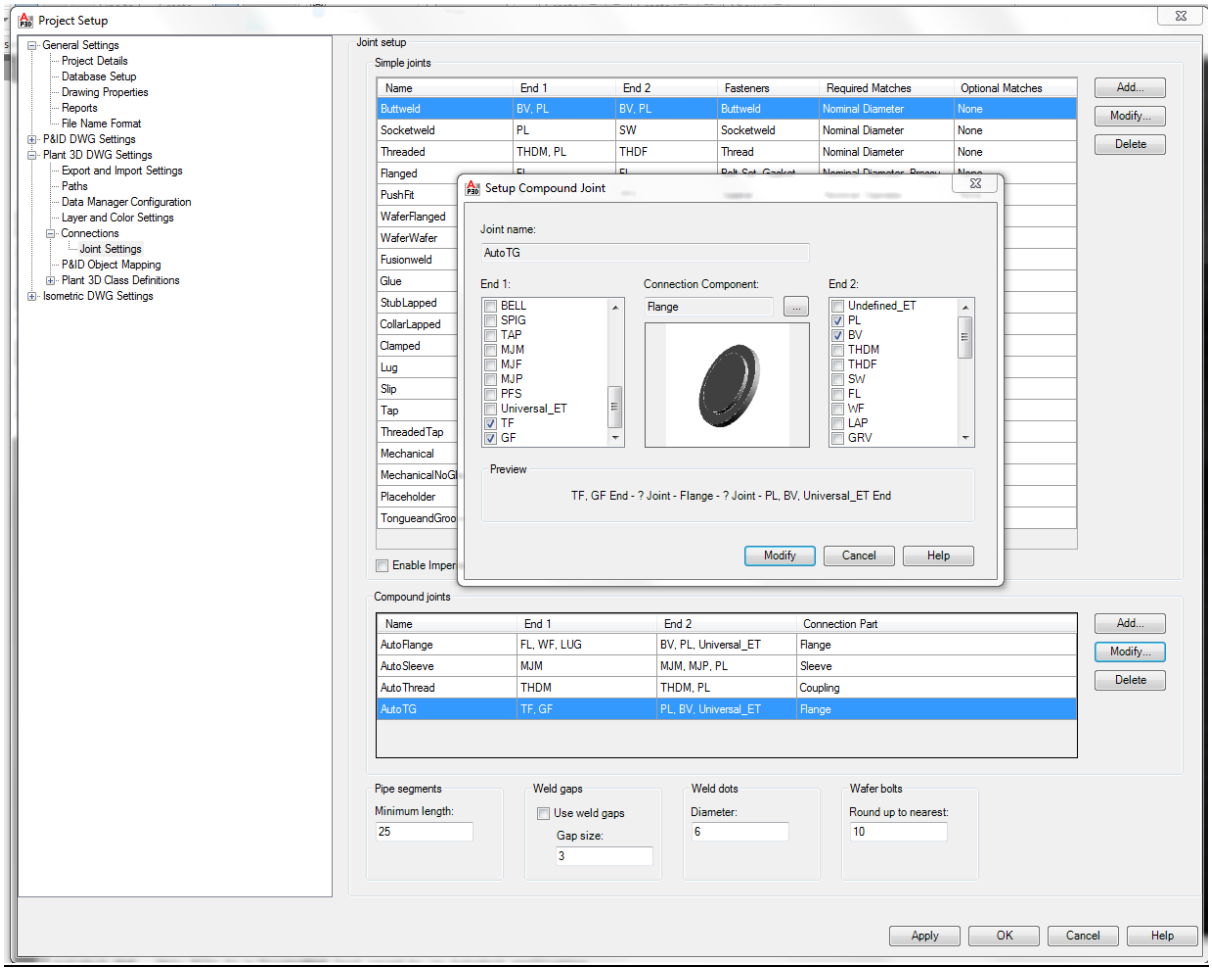

Project Setup
General Settings
Project Details
Database Setup
Drawing Properties
Reports
File Name Format
P&ID DWG Settings
Plant 3D DWG Settings
Export and Import Settings
Paths
Data Manager Configuration
Layer and Color Settings
Connections
Joint Settings
P&ID Object Mapping
Plant 3D Class Definitions
Isometric DWG Settings
Joint setup
Simple joints
Name | End 1 | End 2 | Fasteners | Required Matches | Optional Matches
Buttweld | BV, PL | BV, PL | Buttweld | Nominal Diameter | None
Socketweld | PL | SW | Socketweld | Nominal Diameter | None
Threaded | THDM, PL | THDF | Thread | Nominal Diameter | None
Flanged | FL
PushFit | PL
WaferFlanged | FL
WaferWafer | WF
Fusionweld | PPL
Glue | PPL
StubLapped | LAP
CollarLapped | LAP
Clamped | PL, GRV
Lug | FL
Slip | SO
Tap | TAP
ThreadedTap | TAP
Mechanical | MJM, PL
MechanicalNoGland | MJP
Placeholder | Universal_E
TongueandGroove | TF
Add...
Modify...
Delete
Enable Imperial to Metric connection
Compound joints
Name | End 1
AutoFlange | FL, WF, LU
AutoSleeve | MJM
AutoThread | THDM
AutoTG | TF, GF
Add...
Modify...
Delete
Pipe segments
Minimum length:
25
Weld gaps
Use weld gaps
Gap size:
3
Weld dots
Diameter:
6
Wafer bolts
Round up to nearest:
10
Apply
OK
Cancel
Help
Add Joint
Joint name:
TongueandGroove
Connection settings
End 1:
MJF
MJP
PFS
Universal_ET
TF
GF
End 2:
MJF
MJP
PFS
Universal_ET
TF
GF
Fasteners:
Bolt Set
Buttweld
Clamp
Collar
Fusion Weld
Gasket
Property matches
Required | Property
Add Property...
Matching Values...
Delete
Add
Cancel
Help

Figure 4



Project Settings are ready now. Next step is to make the flanges in the catalog.

- Open: AutoCAD Plant3D 2012 Spec Editor
- Open: Catalog (Pipes and Fitting Catalog)
- search and select a basic flange in the catalog
  For example, Flange WN, 150 LB, RF, ASME B16.5
- Duplicate component (2X)
- Rename : Flange WN, cl. 150, TF, ASME B16.5
  Flange WN, cl.150, GF, ASME B16.5
- <TAB> General Properties:
  - Port1 End type : TF (GF)
    Facing : TF (GF)
  - Port 2 End type : BV (BV)

- <TAB> Size: change size for L (example for 1”) see also table below.
  - Normally Raised Face flange : L= 55.6 mm
  - For Tongue Face Flange : L= 61.0 mm
  - For Groove Face Flange : L= 54.0 mm

See Figure 5 (Tongue) and Figure 6 (Groove)

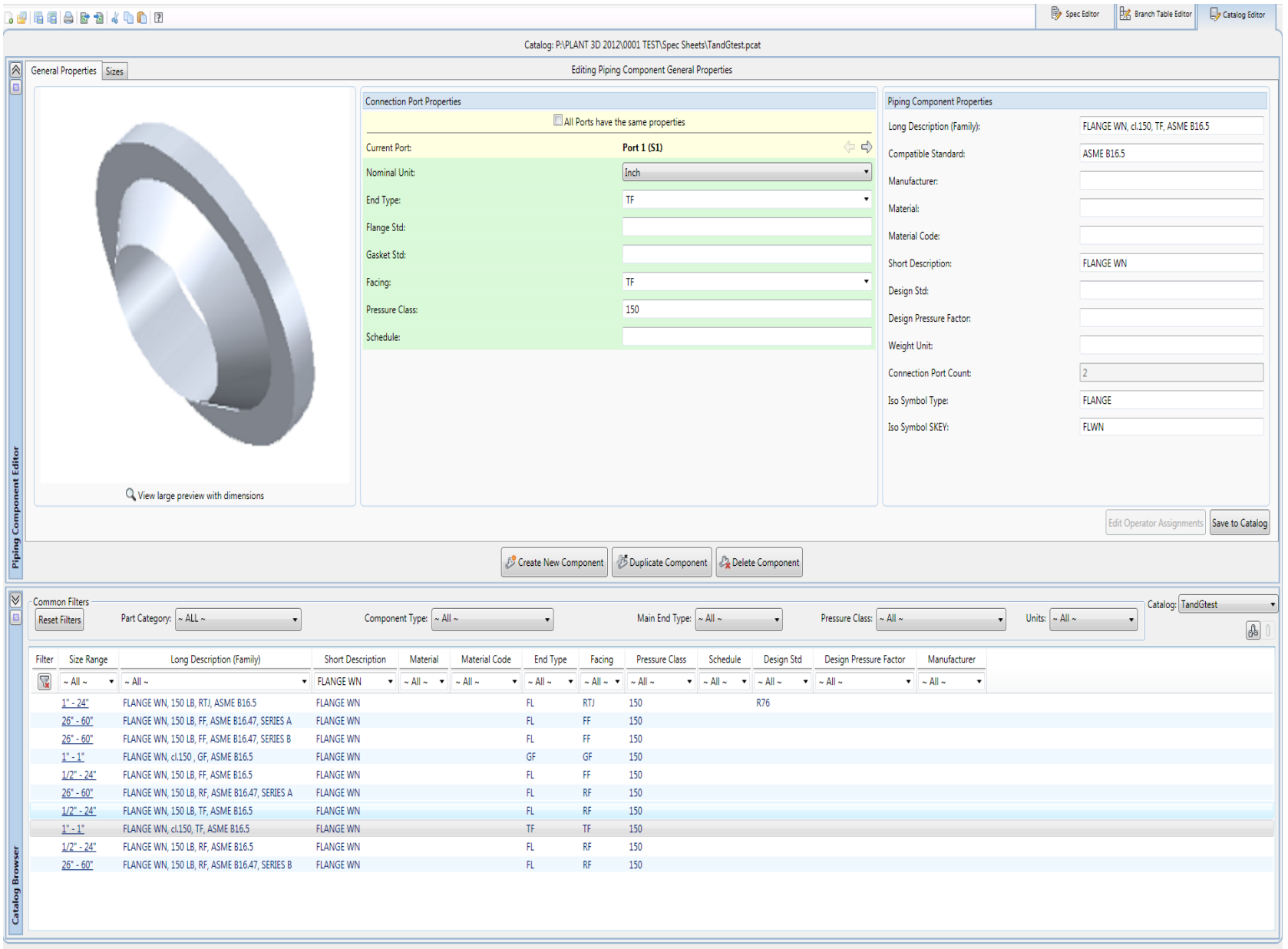
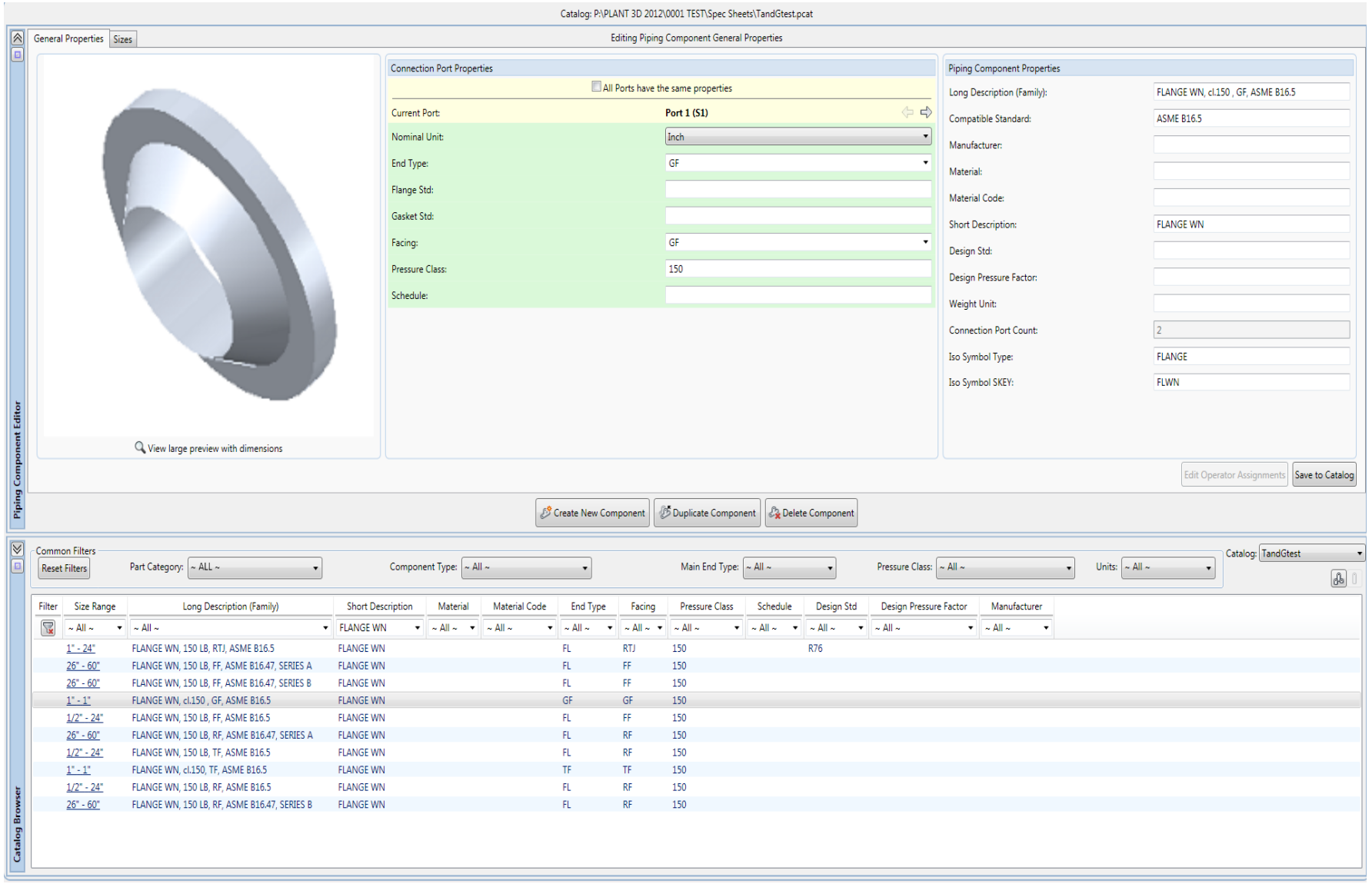
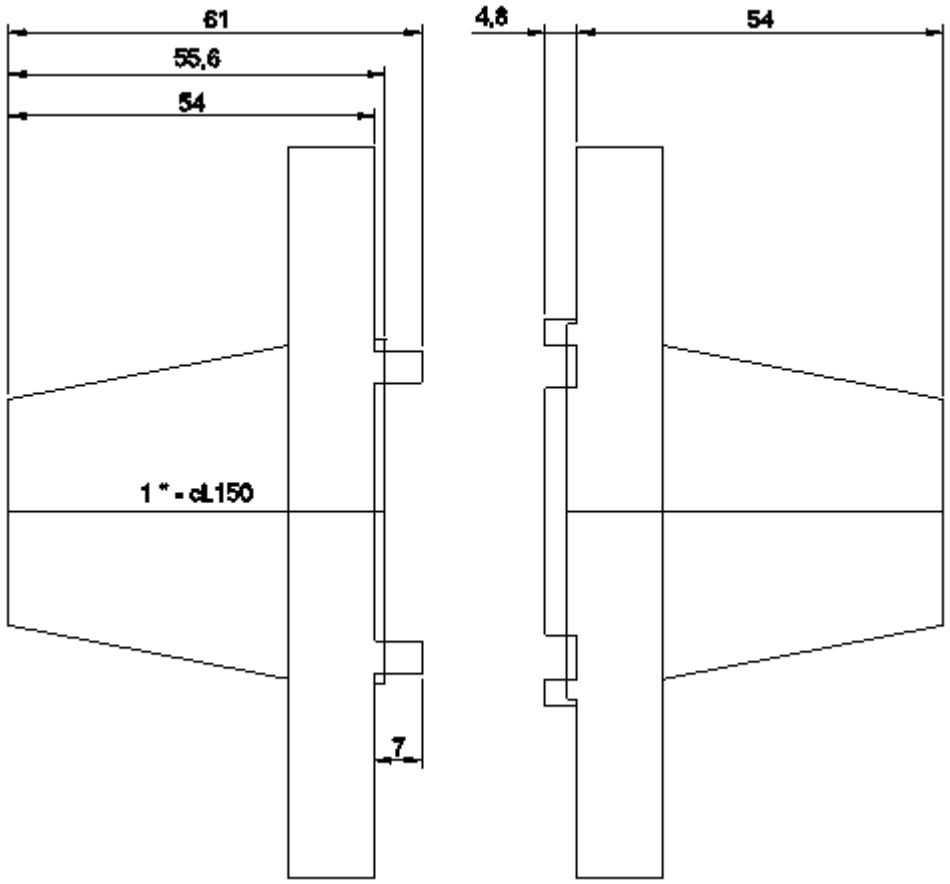

Spec Editor
Branch Table Editor
Catalog Editor
Catalog: P:\PLANT 3D 2012\0001 TEST\Spec Sheets\TandGtest.pcat
Piping Component Editor
General Properties
Sizes
Editing Piping Component General Properties
View large preview with dimensions
Connection Port Properties
All Ports have the same properties
Current Port:
Port 1 (S1)
Nominal Unit:
Inch
End Type:
TF
Flange Std:
Gasket Std:
Facing:
TF
Pressure Class:
150
Schedule:
Piping Component Properties
Long Description (Family):
FLANGE WN, cl.150, TF, ASME B16.5
Compatible Standard:
ASME B16.5
Manufacturer:
Material:
Material Code:
Short Description:
FLANGE WN
Design Std:
Design Pressure Factor:
Weight Unit:
Connection Port Count:
2
Iso Symbol Type:
FLANGE
Iso Symbol SKEY:
FLWN
Edit Operator Assignments
Save to Catalog
Create New Component
Duplicate Component
Delete Component
Catalog Browser
Common Filters
Reset Filters
Part Category:
~ ALL ~
Component Type:
~ All ~
Main End Type:
~ All ~
Pressure Class:
~ All ~
Units:
~ All ~
Catalog:
TandGtest
Filter
Size Range
Long Description (Family)
Short Description
Material
Material Code
End Type
Facing
Pressure Class
Schedule
Design Std
Design Pressure Factor
Manufacturer
1" - 24" FLANGE WN, 150 LB, RTJ, ASME B16.5 FLANGE WN FL RTJ 150 R76
26" - 60" FLANGE WN, 150 LB, FF, ASME B16.47, SERIES A FLANGE WN FL FF 150
26" - 60" FLANGE WN, 150 LB, FF, ASME B16.47, SERIES B FLANGE WN FL FF 150
1" - 1" FLANGE WN, cl.150 , GF, ASME B16.5 FLANGE WN GF GF 150
1/2" - 24" FLANGE WN, 150 LB, FF, ASME B16.5 FLANGE WN FL FF 150
26" - 60" FLANGE WN, 150 LB, RF, ASME B16.47, SERIES A FLANGE WN FL RF 150
1/2" - 24" FLANGE WN, 150 LB, TF, ASME B16.5 FLANGE WN FL RF 150
1" - 1" FLANGE WN, cl.150, TF, ASME B16.5 FLANGE WN TF TF 150
1/2" - 24" FLANGE WN, 150 LB, RF, ASME B16.5 FLANGE WN FL RF 150
26" - 60" FLANGE WN, 150 LB, RF, ASME B16.47, SERIES B FLANGE WN FL RF 150

Figure 5

Figure 6


Catalog: P:\PLANT 3D 2012\0001 TEST\Spec Sheets\TandGtest.pcat
Piping Component Editor
General Properties
Sizes
Editing Piping Component General Properties
View large preview with dimensions
Connection Port Properties
All Ports have the same properties
Current Port:
Port 1 (S1)
Nominal Unit:
Inch
End Type:
GF
Flange Std:
Gasket Std:
Facing:
GF
Pressure Class:
150
Schedule:
Piping Component Properties
Long Description (Family):
FLANGE WN, cl.150 , GF, ASME B16.5
Compatible Standard:
ASME B16.5
Manufacturer:
Material:
Material Code:
Short Description:
FLANGE WN
Design Std:
Design Pressure Factor:
Weight Unit:
Connection Port Count:
2
Iso Symbol Type:
FLANGE
Iso Symbol SKEY:
FLWN
Edit Operator Assignments
Save to Catalog
Create New Component
Duplicate Component
Delete Component
Catalog Browser
Common Filters
Reset Filters
Part Category:
~ ALL ~
Component Type:
~ All ~
Main End Type:
~ All ~
Pressure Class:
~ All ~
Units:
~ All ~
Catalog:
TandGtest
Filter
Size Range
Long Description (Family)
Short Description
Material
Material Code
End Type
Facing
Pressure Class
Schedule
Design Std
Design Pressure Factor
Manufacturer
1" - 24" FLANGE WN, 150 LB, RTJ, ASME B16.5 FLANGE WN FL RTJ 150 R76
26" - 60" FLANGE WN, 150 LB, FF, ASME B16.47, SERIES A FLANGE WN FL FF 150
26" - 60" FLANGE WN, 150 LB, FF, ASME B16.47, SERIES B FLANGE WN FL FF 150
1" - 1" FLANGE WN, cl.150 , GF, ASME B16.5 FLANGE WN GF GF 150
1/2" - 24" FLANGE WN, 150 LB, FF, ASME B16.5 FLANGE WN FL FF 150
26" - 60" FLANGE WN, 150 LB, RF, ASME B16.47, SERIES A FLANGE WN FL RF 150
1/2" - 24" FLANGE WN, 150 LB, TF, ASME B16.5 FLANGE WN FL RF 150
1" - 1" FLANGE WN, cl.150, TF, ASME B16.5 FLANGE WN TF TF 150
1/2" - 24" FLANGE WN, 150 LB, RF, ASME B16.5 FLANGE WN FL RF 150
26" - 60" FLANGE WN, 150 LB, RF, ASME B16.47, SERIES B FLANGE WN FL RF 150

Size	RF flange H= h	T(tongue) Face H= h+5,4	G(groove) Face H= h-1,6
1/2”	47,8	53,2	46,2
3/4”	52,3	57,7	50,7
1”	55,6	61,0	54,0
1.1/2”	62,0	67,4	60,4
2”	63,5	68,9	61,9



Gasket:

Gasket port 1(S1) and port 2(S2)
End type : Undefined_ET
Facing : blanc

Valve: (Both sides Groove Facing)
General Properties:

Port1	End type	: GF
	Facing	: GF
Port 2	End type	: GF
	Facing	: GF

Complete pipe spec in Figure 7

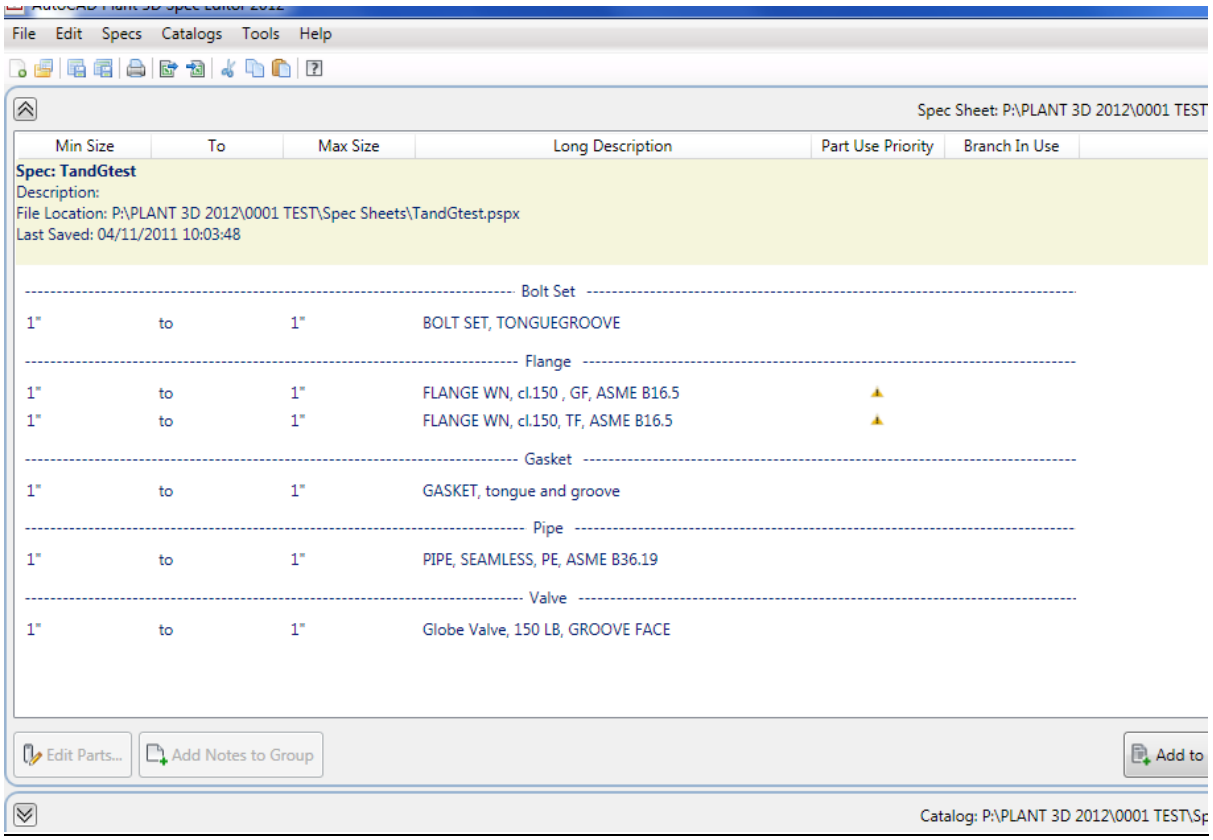
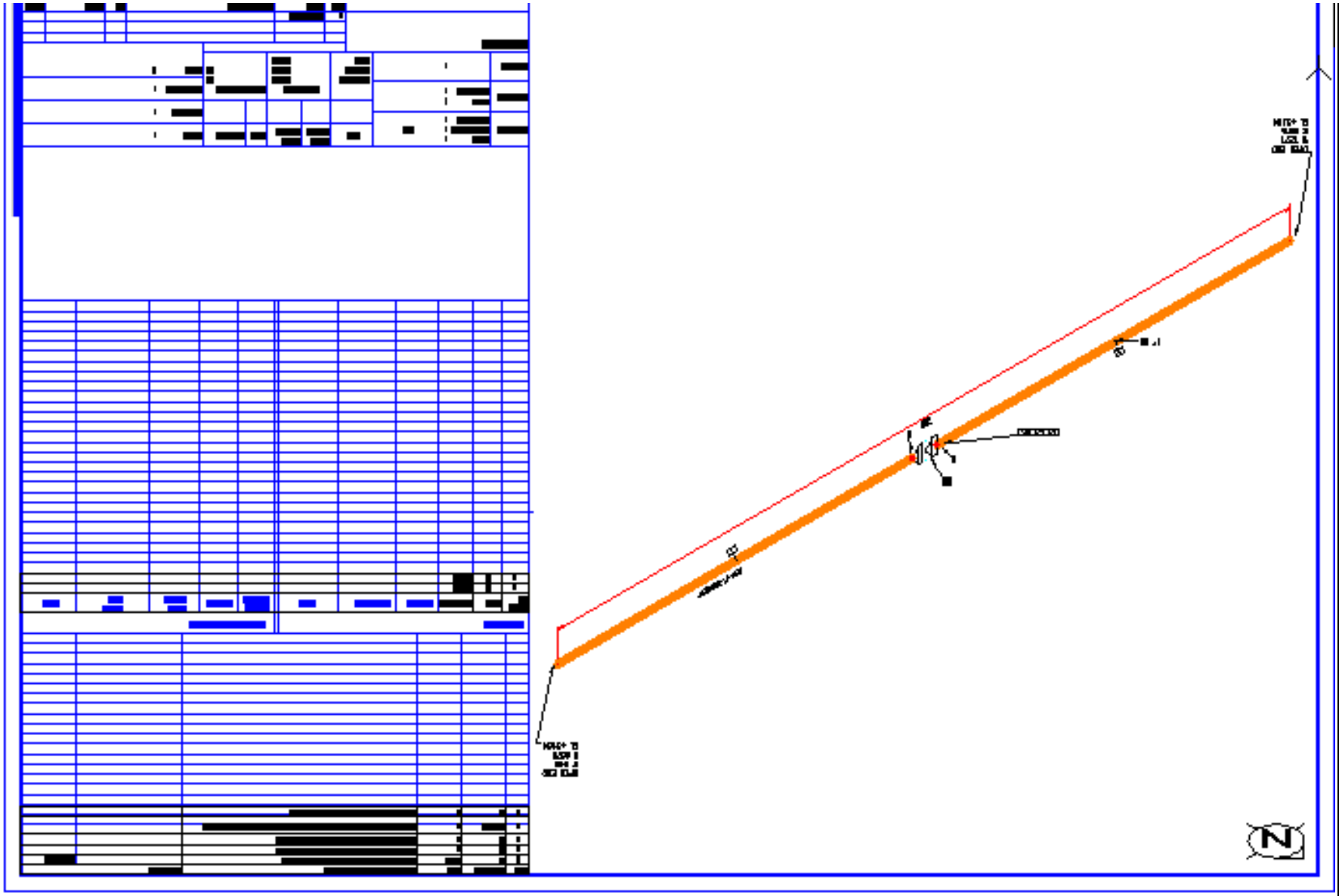



Figure 7