	<b>DESIGN VERIFICATION</b> <b>(설계검증)</b>		DOC NO.	BMT-DV-IDS-L1
			DATE	14.01.25
			PAGE NO.	1 of 6
PROJECT NAME				
DESCRIPTION	DOUBLE BLOCK & BLEED VALVE, 1-1/2" (DN-40), CLASS 900 RF x 1/2"(DN-15), CLASS 2500, RTJ, INJECTION QUILL			
REF. STANDARD	ASME B 16.34 / API 608/ DSPI-1010			
ITEM	DESIGN INPUT	DESIGN OUTPUT	검증결과 및 의견	
			YES	NO
1. Pressure & Temperature Rating	Design Pressure and Rating - Inlet : DN 15 (NPS 1/2") Class 2500 - Outlet : DN 40 (NPS 1-1/2") Class 900 - Vent : DN 15 (NPS 1/2") FNPT  Maximum Operating Pressure and Temp. -Max. Operating Pressure at -25°C : 124.1 bar -Max. Operating Pressure at 150°C : 94.2 bar	- Inlet : DN 15 (NPS 1/2") Class 2500 - Outlet : DN 40 (NPS 1-1/2") Class 900 - Vent : DN 15 (NPS 1/2") FNPT  -Max.Operating Pressure at -25°C : 148.9 bar -Max.Operating Pressure at 150°C : 115.5 bar  -Evidence Document Drawing number : BY-DB2B-24DJ8F-MR36L 130418-01-113 (A'SSY Drawing)		
2. Valve Configuration	-Reducer Bore (10mm) -ASME B 16.34/API 608  -Class 900 - Raised face flange Class 2500 - Ring & groove type flange  -265mm (Customer Approved)  -One Piece Forging body, Double Block (Ball) & Bleed (Needle), Floating Ball, Side Entry Internal Check (Spring Loaded)  -Lever Operation	-Bore Size : 50mm -Flange End: Class 900 - Raised face flange Class 2500 - Ring & groove type flange  -Face to Face Dimensions : 265mm  -Body Construction : One Piece Forging body, Double Block (Ball) & Bleed (Needle), Floating Ball, Side Entry, Internal Check (Spring Loaded) Uni-Directional Flow -Ball Construction : Floating -Operator : Lever  -Evidence Document Drawing number : 130418-01-113 (A'SSY Drawing)		
0				
REV NO.	NAME		NAME	
	DATE		DATE	
	VERIFIED BY		APPROVED BY	



# DESIGN VERIFICATION (설계검증)

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PROJECT NAME				
DESCRIPTION		DOUBLE BLOCK & BLEED VALVE, 1-1/2" (DN-40), CLASS 900 RF x 1/2"(DN-15), CLASS 2500, RTJ, INJECTION QUILL		
REF. STANDARD		ASME B 16.34 / API 608/ DSPI-1010		
ITEM	DESIGN INPUT	DESIGN OUTPUT	검증결과 및 의견	
			YES	NO
3. Valve Operation	-Flow coefficient Cv : 2.03 -Torque of Ball & Seat : 51.5 kgfcm -Torque of Stem thrust : 25.94 kgfcm -Torque of Gland packing : 161.47 kgfcm -Breakaway Stem thrust : 741.86 kgf -Breakaway Stem torque : 238.91 kgfcm -Max. allowable stem thrust : 1598.07 kgf -Max. allowable stem torque : 479.42 kgfcm	-Flow coefficient Cv : 2.03 -Torque of Ball & Seat : 51.5 kgfcm -Torque of Stem thrust : 25.94 kgfcm -Torque of Gland packing : 161.47 kgfcm -Breakaway Stem thrust : 741.86 kgf -Breakaway Stem torque : 238.91 kgfcm -Max. allowable stem thrust : 1598.07 kgf -Max. allowable stem torque : 479.42 kgfcm  -Evidence Document Design Calculation : BMT-DC-IDS-LI		
4. Pigging	-No Required	-No Required		
5. Valve End	<b>ASME B 16.5-2009</b> - Class2500 NPS 1/2" -Ring & groove type No. R12 -Flange O.D 135 mm -Flange Min. Thickness 30.2 mm -Dia. Of Bolt Circle 88.9 mm -Dia. Of Hub 42.9 mm -Dia. Of Bolt Hole 22.4 mm  ASME B 16.5-2009 - Class900 NPS 1- 1/2" -Flange O.D 178 mm -Flange Min. Thickness 22.4 mm -Dia. Of Bolt Circle 124 mm -Dia. Of Hub 69.9 mm -Dia. Of Bolt Hole 28.4 mm  <b>ASME B 1.20.1 - NPS 1/2" FNPT</b>	ASME B 16.5-2009 - Class2500 NPS 1/2" -Ring & groove type No. R12 -Flange O.D 135 mm -Flange Min. Thickness 30.2 mm -Dia. Of Bolt Circle 88.9 mm -Dia. Of Hub 42.9 mm -Dia. Of Bolt Hole 22.4 mm  ASME B 16.5-2009 - Class900 NPS 1- 1/2" -Flange O.D 178 mm -Flange Min. Thickness 22.4 mm -Dia. Of Bolt Circle 124 mm -Dia. Of Hub 69.9 mm -Dia. Of Bolt Hole 28.4 mm  ASME B 1.20.1 - NPS 1/2" FNPT  -Evidence Document Drawing Number : BY-DB2B-24DJ8F-MR36L 130418-01-113 (A'SSY Drawing)		
6. Pressure Relief	-No Required	-No Required		
7. Bypass, Drain and Vent	-No Required	-No Required		



# DESIGN VERIFICATION (설계검증)

DOC NO.

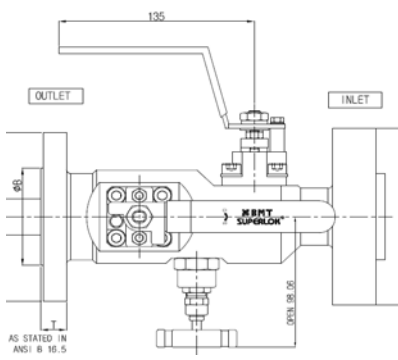
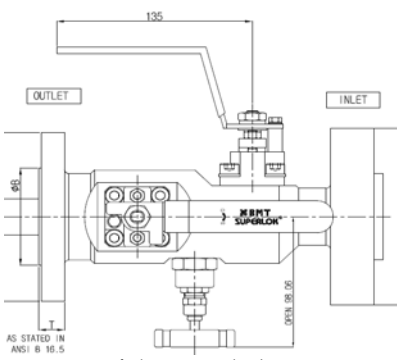
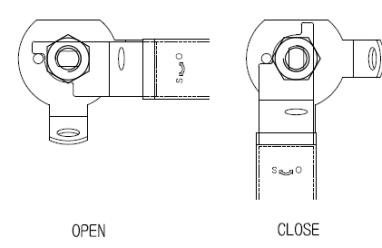
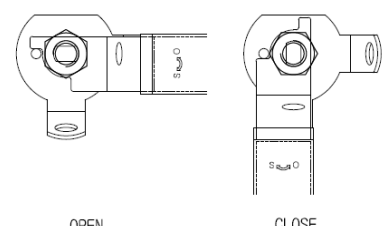
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PROJECT NAME				
DESCRIPTION	DOUBLE BLOCK & BLEED VALVE, 1-1/2" (DN-40), CLASS 900 RF x 1/2"(DN-15), CLASS 2500, RTJ, INJECTION QUILL			
REF. STANDARD	ASME B 16.34 / API 608/ DSPI-1010			
ITEM	DESIGN INPUT	DESIGN OUTPUT	검증결과 및 의견	
			YES	NO
8. Hand-wheel and wrench -Lever  or  Actuator Arrangement	<p>-Lever Operated</p>  <p>-Direction of closing is clockwise.</p>	<p>-Lever Operated -Configuration</p>  <p>-Direction of closing is clockwise.</p> <p>-Evidence Document Drawing Number 130418-01-113 (A'SSY Drawing)</p>		
9. Locking Device	<p>-Configuration</p> 	<p>-Configuration</p>  <p>-Evidence Document Drawing Number 130418-01-113 (A'SSY Drawing)</p>		
10. Position Indicator	-No Requirement	-No Requirement		
11. Injection Point	-No Requirement	-No Requirement		
12. Lifting Lug	-No Requirement	-No Requirement		



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PROJECT NAME

DESCRIPTION

DOUBLE BLOCK & BLEED VALVE, 1-1/2" (DN-40), CLASS 900 RF x 1/2"(DN-15), CLASS 2500, RTJ, INJECTION QUILL

REF. STANDARD

ASME B 16.34 / API 608 / DSPI-1010

ITEM

DESIGN INPUT

DESIGN OUTPUT

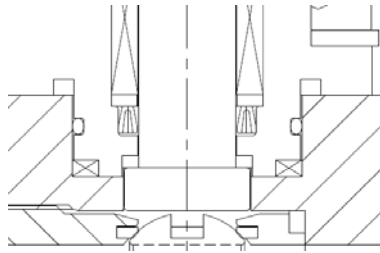
검증결과 및 의견

YES

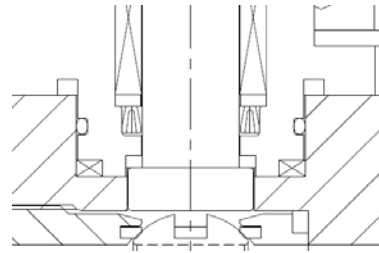
NO

13. Stem Retention

-Blow out Proof Stem Design



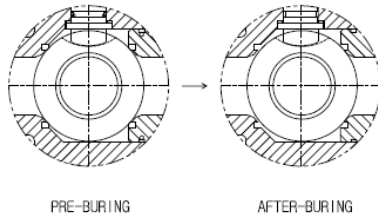
-Blow out Proof Stem Design



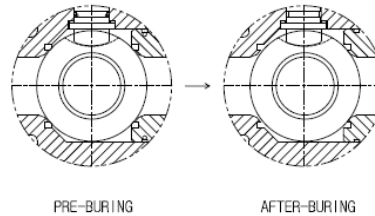
-Evidence Document  
Drawing Number  
130418-01-113 (A'SSY Drawing)  
BY-DB2B-24DJ8F-MR36L  
BY-FE-A-BT  
BY-FE-A-SM

14. Fire Safety Test

-Following method shall be considered



-Fire Safety Design



-Evidence Document  
Drawing Number  
130418-01-113 (A'SSY Drawing)  
BY-DB2B-24DJ8F-MR36L  
BY-BL-BS-PE  
BY-BL-BL-36L  
BY-FE-A-SM

15. Anti-Static Device

-No Requirement

-No Requirement



# DESIGN VERIFICATION (설계검증)

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PROJECT NAME

DESCRIPTION

DOUBLE BLOCK & BLEED VALVE, 1-1/2" (DN-40), CLASS 900 RF x 1/2"(DN-15), CLASS 2500, RTJ, INJECTION QUILL

REF. STANDARD

ASME B 16.34 / API 608/ DSPI-1010

ITEM

DESIGN INPUT

DESIGN OUTPUT

검증결과 및 의견

YES

NO

16. Material

-Body / End Connector : **A182 F316L**  
 -Ball : A182 F316L  
 -Needle : A182 F316 + H.F  
 -Check : A182 F316L  
 -Probe : **A312 TP316L**  
 -Stem : **A276-316**  
 -Stem Seal : Lip Seal + Graphite Seal  
 -Seat Ring : A182 F316L  
 -Seat : PEEK  
 -Lip Seal : PEEK + ELGILOY R3003  
 -O-Ring : VITON-AED  
 -Gasket : Graphite Filler  
 -Spring : INCONEL X-750  
 -Bolts/Nuts : **A194 8M**  
 (Customer Approved)

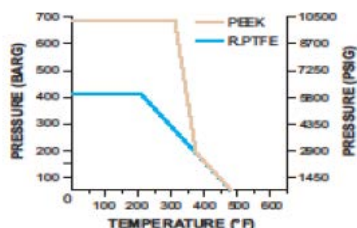
Chemical Composition (max.)

	A182 F316L	A276-316
C	0.30	0.30
Mn	2.00	2.00
Si	1.00	1.00
S	0.03	0.03
P	0.045	0.045
Cr	18.0	18.0
Ni	15.0	14.0-
Mo	3.00	-
Cu	-	-

Mechanical Properties (min.)

	A182 F316L	A276-316
TS	75 KSI	75 KSI
YS	30 KSI	30 KSI
E	30 %	40 %
R	40 %	50 %

-PEEK P-T Graph



-Body / End Connector : A182 F316L  
 -Ball : A182 F316L  
 -Needle : A182 F316 + H.F  
 -Check : A182 F316L  
 -Probe : A312 TP316L  
 -Stem : A276-316  
 -Stem Seal : Lip Seal + Graphite Seal  
 -Seat Ring : A182 F316L  
 -Seat : PEEK  
 -Lip Seal : PEEK + ELGILOY R3003  
 -O-Ring : VITON-AED  
 -Gasket : Graphite Filler  
 -Spring : INCONEL X-750  
 -Bolts/Nuts : A194 8M

-Body : ASTM A182 F316L

chemical composition (max.)

C	0.10
Mn	1.407
Si	0.384
S	0.0214
P	0.0326
Cr	16.865
Ni	10.107
Mo	2.064
Mill Cert. No.	140327-2108

Mechanical Properties (min.)

TS	80 KSI
YS	37 KSI
E	64 %
R	81 %
Mill Cert. No.	140327-2108

-Stem : ASTM A276-316

chemical composition (max.)

C	0.24
Mn	1.417
Si	0.354
S	0.181
P	0.0306
Cr	16.635
Ni	10.050
Mo	2.019
Mill Cert. No.	20220-2021

Mechanical Properties (min.)

TS	89 KSI
YS	46 KSI
E	56 %
R	75 %
Mill Cert. No.	20220-2021



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PROJECT NAME

DESCRIPTION

DOUBLE BLOCK & BLEED VALVE, 1-1/2" (DN-40), CLASS 900 RF x 1/2"(DN-15), CLASS 2500, RTJ, INJECTION QUILL

REF. STANDARD

ASME B 16.34 / API 608/ DSPI-1010

ITEM

DESIGN INPUT

DESIGN OUTPUT

검증결과 및 의견

YES

NO

17. Toughness Test of Material

-No Requirement

-No Requirement

18. Bolt

-Shall use Standard Bolt and Nut  
-Stud Bolt : N/A  
-Stem Nut : A194 8M

-Used Bolts / Nuts :  
-Stud Bolt : N/A  
-Stem Nut : A194 8M

TABLE 2 Hardness Requirements			
Grade and Type	Completed Nuts		
	Brinell Hardness	Rockwell Hardness	
		C Scale	B Scale
1	121 min	—	70 min
2	159 to 202	—	84 min
2H to 1 1/2 in. or M36, incl	248 to 327	24 to 35	—
2H over 1 1/2 in. or M36	212 to 327	35 max	95 min
2HM and 7M	159 to 235	—	84 to 99
3, 4, 7, and 18	248 to 327	24 to 35	—
6 and 6F	228 to 271	20 to 28	—
8, 8C, 8M, 8T, 8F, 8F, 8N, 8MN, 8LN, 8MLN	126 to 300	32 max	60 min
8MLC, 8M, and 9C	—	—	—
8A, 8CA, 8BA, 8TA, 8FA, 8FA, 8NA, 8MNA, 8LNA, 8MLNA, 8MLCNA, and 8CA	126 to 192	—	60 to 90
8F, 8FA, 8S, and 8SA	183 to 271	25 max	88 min

-Evidence Document  
Drawing Number  
130418-01-113 (A'SSY Drawing)

19. Sour Service

-NACE-MR-0175

-NACE-MR-0175

-Evidence Document  
Mill Cert. No  
140327-2108

20. Welding & NDE

-Repair Welding not Permitted.

21. Inspection and Testing

-Valve Bore size and Face to Face dimension

Bore Size	Face to Face
10 mm	265 ± 2mm

-Valve Bore size and Face to Face dimension

Bore Size	Face to Face
10 mm	265 ± 2mm

-Hydrostatic Pressure Testing

Shell Test	
Test Pressure (bar)	Duration (Min)
224	2

-Hydrostatic Pressure Testing

Shell Test	
Test Pressure (bar)	Duration (Min)
224	2

Seat Test

Test Pressure (bar)	Duration (Min)
164	2

Seat Test

Test Pressure (bar)	Duration (Min)
164	2

-Evidence Document  
Drawing Number  
130418-01-113 (A'SSY Drawing)

Inspection Standard  
BMT-WS-501-02/ BMT-Q1-1001  
BMT-Q1-1002 / BMT-Q1-4001

## BMT Co., Ltd - SUPERLOK TUBE FITTING (I-Fitting) applicable code & standard

### 1. DESIGN

: Manufacturer Standard

### 2. Pressure & Temperature Rating

: ASME B31.3 Process Piping

### 3. Thread

Thread Type		Applicable Standards
TAPER	NPT	ASME B1.20.1 PIPE THREADS, GENERAL PURPOSE
	BSPT (PT)	JIS B0203, ISO 7/1
STRAIGHT	Unified Screw	ASME B1.1 Unified Inch Screw Threads
	BSPP (PF)	ISO 228/1
	Metric	ISO 261

### 4. End Connection

End Connection	Thread Standard
BSP (British Pipe Standard)	
BSPP 5200	ISO 228/1
	ISO 7/1
DIN (Deutsches Institut für Normung e.V.)	
DIN EN 837-1 & EN 837-3, Type B	ISO 228/1
	ISO 261
DIN 3852 Part 1, Type A	ISO 261
DIN 3852 Part 1, Type B	ISO 261
DIN 3852 Part 2, Type A	ISO 228/1
DIN 3852 Part 2, Type B	ISO 228/1
DIN 3852 Part 2, Type C	ISO 7/1
JIS (Japanese Industrial Standard)	
JIS 30° Flare (B8363)	ISO 228/1
JIS Parallel Pipe (B8363)	ISO 228/1
JIS Parallel Metric (B8363)	ISO 261
JIS PT (B8363)	ISO 7/1
NPT (National Pipe Taper)	
NPT	ASME B1.20.1
SAE (Society of Automotive Engineers)	
SAE J1453 O-Ring Face Seal	ASME B1.1
SAE 37° JIC (J514)	ASME B1.1
SAE Straight Thread O-Ring Boss	ASME B1.1