Phillips® REFRIGERATION
VALVES • VESSELS • SYSTEMS • ACCESSORIES

Level Eye® Sight Glass
Series 1100
BULLETIN 1100-24E-01
Engineering Data

For Ammonia (R717) and Other Refrigerants

FEATURES

- **Suitable for ASME Code Vessels**
- **SA36 Steel Construction Standard**
- **Also available in Stainless Steel**
- **Suitable for Low Temperature Applications**
- **Canadian Registered—All Provinces CRN 0F00829.2C (all models carbon and stainless steel except 1100V)**

DESCRIPTION

The Phillips Level Eye® is a reliable, industrial type sight glass. The reflex lens indicates the true level of liquid present without requiring a second lens. The lens appears dark in the presence of liquid and clear when liquid is not present. Both reflex and clear lenses are suitable for refrigerant vessels such as receivers, intercoolers, suction accumulators, oil separators, surge drums, oil pots, columns, and liquid line indicators. The standard length frost shield allows clear vision with refrigerant temperatures down to –20ºF/-29ºC, and a longer frost shield is available for refrigerant temperatures below –20ºF/-29ºC.

STANDARD LEVEL EYE ASSEMBLIES

Housing Style/Material	Assembly Number*	Connection Geometry	Weight (lbs)
Weld SA36	1100	Square End	1.5
	1100A	Square End	2.0
	1100C	Saddle Milled	1.5
	1100L	Square End	3.0
	1100LC	Saddle Milled	3.0
Weld 304SS	1100S	Square End	1.5
	1100SC	Saddle Milled	1.5
	1100LS	Square End	3.0
	1100LSC	Saddle Milled	3.0
Threaded SA36	1100AT	1-1/2" MPT	2.0
	1100T	1-1/2" MPT	3.0
Threaded Steel Forging	1100V	2" MPT	1.5
Threaded 304SS	1100SL	1-1/2" MPT	3.0

*See next page for Level Eye® assemblies, parts and instructions

EXAMPLE ASSEMBLIES

Clockwise from upper left: 1100L/11000SL, 1100V, 1100/1100S, 1100AT

DESIGN FUNCTION

The 1100 Series Level Eye® is machined from SA36 material, as specified in Section VIII, Division 1 of the ASME Boiler & Pressure Vessel Code. The housing may be welded directly into the ASME Code vessels. The welding end and threaded end are both dimensioned to a nominal 1-1/2" IPS schedule 80 pipe. Type 304 stainless steel housings are also available in both weld end and threaded varieties. All retainers are annealed 416 stainless steel forgings regardless of the body material.
The 1101 clear lens and 1101R reflex lens are both made of borosilicate glass. Both are used with a standard neoprene gasket between the lens and the housing, and a fiber gasket between lens and retainer. The maximum temperature differential for the glass is 477ºF; the maximum temperature for the standard gaskets is 250ºF. When using the optional Teflon (PTFE) gasket the maximum temperature is 400ºF. For temperatures below –20ºF/-29ºC refer to fig. UCS-66.01 of the ASME Code. The Phillips Level Eyes are in compliance with the intent of the ASME Boiler & Pressure Vessel Code, Section VIII, Division 1.

ASSEMBLY PARTS

Part Type	Part Number	Description
Housings Weld SA36	1100H	2" long housing, square end
	1100AH	3" long housing, square end
	1100CH	2" long housing, saddle milled
	1100LH	2" long housing, square end
	1100LCH	4" long housing, saddle milled
Housings Weld 304SS	1100SH	2" long housing, square end
	1100LSH	4" long housing, square end
	1100SCH	2" long housing, saddle milled
	1100LSCH	4" long housing, saddle milled
Housings Threaded SA36	1100ATH	3" long housing, 1-1/2" MPT
	1100TH	4" long housing, 1-1/2" MPT
Housing Thd'd Steel Forging	1100VH	1-1/2" long housing, 2" MPT
Housing Threaded 304SS	1100LSTH	4" long housing, 1-1/2" MPT
Lenses	1101	Clear lens, borosilicate glass
	1101R	Reflex lens, borosilicate glass
Retainer	1102SH	Retainer, forged 416SS Hex
Gaskets ** & O-Rings	1103 **	Gasket standard, Neoprene **
	1104B **	Gasket, Buna-N **
	1103T **	Gasket, Teflon (PTFE) **
	1104	Gasket, Vulcanized Fiber
	1106	O-Ring, Neoprene
Frost Shields	1105	Frost shield, Lucite, Std length 1-1/2"
	1105L	Frost shield, Lucite, Ext. length 2-1/2"
Lens Replacement Kits **	K1100 **	Includes 1101 clear lens, 1103 Neoprene gasket, 1104 fiber gasket
	K1100R **	Includes 1101R reflex lens, 1103 Neoprene gasket, 1104 fiber gasket

** Buna-N gasket material (1103B) is recommended for use with propane (R-290) and CO_2 (R-744); Teflon gasket material (1103T) is recommended for use in high pressure applications and also with R-22. For more information on gasket material compatibility with refrigerants and refrigerant oils please contact H.A. Phillips & Co.

ORDERING INSTRUCTIONS

*When ordering please specify the assembly configuration number using the assembly configuration part number
Identifier table beneath:

Assembly Configuration Number Examples:
4" stainless steel Level Eye® with reflex lens, extended frost shield and Teflon gasket is: 1100LS-RNXT
If the exploded assembly to the right had a Neoprene gasket (1103), a reflex lens (1101R, as pictured) and a standard length frost shield (1105), then its configuration part No. would be: 1100-RN.

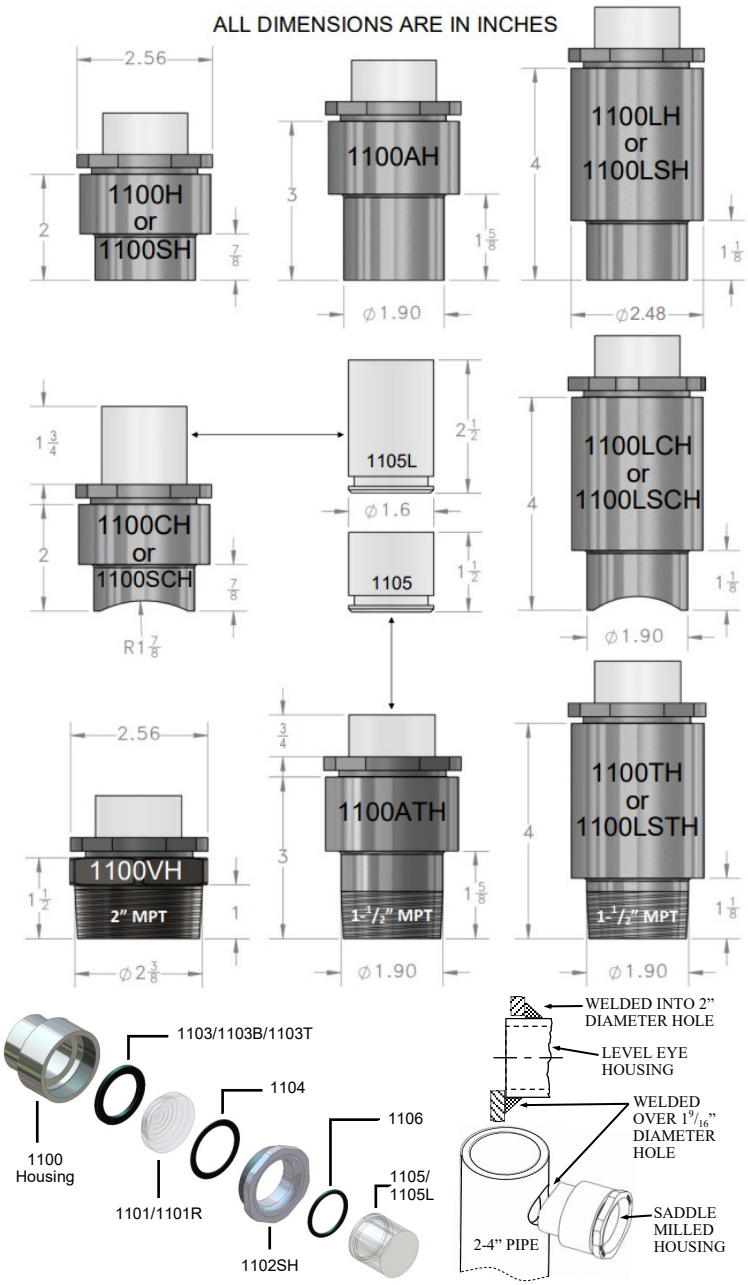
1100	-R	NX	-T
Housing Style *See assembly parts table above*			

LENS
(Blank) = Clear Lens
R = Reflex Lens

FROST SHIELD
(Blank) = No Frost Shield
N = Standard Length (1-1/2")
NX = Extended Length (2-1/2")

GASKET MATERIAL
(Blank) = Standard Neoprene
B = Buna-N
T = PTFE

LEVEL EYE HOUSINGS



1. **To weld:** Housing can be welded into a 2" opening or over a 1-$^{9}/_{16}$" opening as shown above. Remove the retainer, glass, and gaskets before welding. Anti spatter or a clean damp cloth applied/inserted over the threads will help protect the threads from weld spatter. Weld the housing into place employing good welding practices paying special attention to heat input into the work piece as an excessive amount of heat input can distort the housing.
2. Once the work piece has cooled, clean the threads with a cloth or non abrasive nylon brush. Install the lens and gaskets in the order as shown above. Make sure the lens is installed flat against the gaskets and all parts are clean and free of debris. Next insert the retainer, by engaging the threads by hand, being careful to avoid crossing and mutilation of the threads. IF THE RETAINER WILL NOT THREAD IN EASILY, CONTACT H.A. PHILLIPS AT ***(630) 377-0050*** FOR ASSISTANCE
3. Tighten 1102SH retainer to 40-50 ft-lbs torque for a Neoprene (1103) or Buna-N (1103B) gasket. For a Teflon gasket (1103T), torque to 60-70 ft-lbs.
4. **Important:** Upon pressurizing the system (and before installation of a frost shield), and periodically thereafter, check for a proper seal by applying a dish soap/drinking water solution to the Level Eye; keeping an eye out for any bubbles that may form from a leak.
5. If applicable, insert the frost shield using a light coating of Neoprene safe oil on the O-ring; push the frost shield into the 1102SH by hand. A VERY THIN WIRE (AROUND 27 GAUGE) HELD OVER THE O-RING, ALLOWING AIR TO ESCAPE WHILE INSERTING, WILL AID INSTALLATION OF A FROST SHEILD. WITHDRAW THE THIN MATERIAL AFTER INSTALLATION.

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