Technical Specifications For Encapsulated Leak Clamp

A) SUMMARY OF REQUIREMENT FOR ENCAPSULATING TYPE LEAK CLAMP:

B) SPECIAL SPECIFICATION FOR DOME SHAPED ENCAPSULATING TYPE LEAK CLAMP:

SPECIFICATION
1) The function of Dome type Encapsulation Leak Repair Clamp is to encapsulate any, branch Leaking / Non reliable fitting on mainline. 2) The Clamp consists of Two Halves with one half having a Branch Dome. 3) The Clamp is pressurized unequally due to Dome on one half. The same needs to be considered during design. 4) The Clamp shall be provided with all associated Valves and fitting for successful and convenient installation. Vent Valves, Pressure Gauge and lifting belts are to be provided as a minimum. 5) The Clamp shall be suitable for welding to mainline at a convenient time after installation. 6) One Spare set of seal shall be provided in Nitrogen Purged Aluminum casing.

C) GENERAL TECHNICAL SPECIFICATIONS FOR ENCAPSULATING TYPE LEAK CLAMP

Dome shaped encapsulating type leak clamp assembled with studs, nuts and best quality sealing material whole body as per the specification mentioned below :-

Sl. No.	Description	Parameters
1	Design	As per API6H/ ASME SEC VIII DIV.1 / ASME SEC VIII DIV.2
2	Service/ Product to be handled	Liquefied Petroleum Gas (LPG)/ Petroleum products/ Crude Oil
3	Suitability	Suitable for fixing on Spiral / Longitudinal weld pipe of grade as per **Table 1**.
4	Duty	LPG/ Petroleum products/ Crude oil
5	Body	i. Carbon steel plates of weld-able quality (Carbon maximum – 0.25%), ii. Shell – ASTM A 516 Gr. 70, iii. Stiffener – ASTM A105. iv. Longitudinal length of leak clamp should be minimum as per **Table 1**.

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Encapsulated Leak Clamp

Sl. No.	Description	Parameters
6	Studs	i. Alloy steel weld able conforming to ASTM A193- B7 / EN- 19 (minimum 7 nos. studs on either side). Preferable size stud (Diameter) should be 7/8". ii. Studs length 4 nos. (Two on each side) should be 12 inch length and balance 9 inch length.
7	Nuts	i. Alloy steel weld able quality confirming to ii. ASTM A194 Gr. 2H/ EN- 8 iii. Spot facing of the nut seal shall be carried out and no washer shall be used for tightening the nuts.
8	Sealing Material	i. There shall be sealing ring groove of appropriate size on the inner side of the leak clamp body on periphery of clamp. The molded rubber shall cover the groove and covered surface between groove. ii. Best quality "Buna N" rubber packing material approximately 6 mm thick shall be used. The minimum thickness of packing material on surface of body & outside of groove may be 3 – 4 mm. iii. Shelf life of complete material should be minimum 4 year (confirmation is required from bidder in writing) iv. The Seal Material of Clamp shall be suitable for hydrocarbon with following specifications:- • MATERIAL :BUNA N • SHORE HARDNESS: 80 $^{+}$/- 5 A • TENSILE STRENGTH: 150 KG/CM^2 MINIMUM • ELONGATION AT BREAK: 150% MINIMUM. • COMPRESSION SET: 15% MAX. **v) Sealing material shall be installed in a single unit without any joint(s) whatsoever for half leak clamp. No joint/overlapping of sealing material will be acceptable in**
9	Edge Preparation	i. Edge as per ASME B -31.4 shall be done to be welded including nuts & studs of leak clamp. ii. The circumferential ends shall be chamfered (approx. 45 deg.) down to thickness of the pipe (i.e. 0.281") as per ASME B 31.4, section 451.6.2 I 6.
10	Hydro test Pressure	152.0 kg/cm^2 for Class 600 at ambient Temperature. 228.0 kg/cm^2 for Class 900 at ambient Temperature. The seals shall be replaced upon completion of hydro test. Testing shall be carried out in presence of Owner's representative. No visual bulge shall be accepted during hydro test.

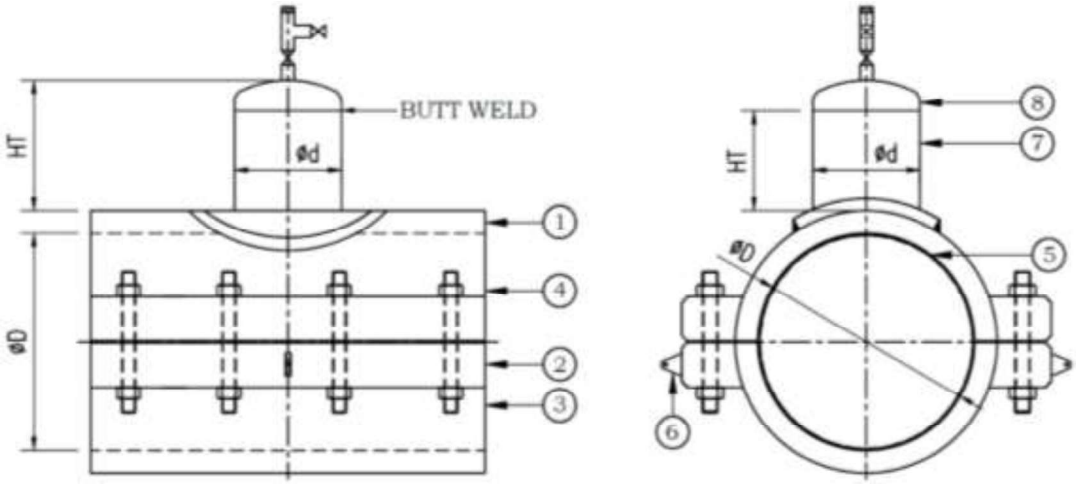
Sl. No.	Description	Parameters
11	Painting	Two coats of Zinc Silicate primer (75DFT each coat), Intermediate Coat – MIO (50DFT), TopCoat – Epoxy Polyurethane (40DFT) with minimum Coating thickness of 240 micron uniformly applied on body (uncovered by seal) of the leak clamp.
12	Documents	**Upon order** i. Quality Assurance plan (Within 15 days from the date of PO) ii. Detailed drawing showing all dimensions i.e. overall length, sealing length, sealing width, inside dia. of the clamp of leak clamp, size of studs, size of nuts etc. iii. Torque for tightening the leak clamp, total weight of the leak clamp. iv. Material test certificate of plate (for shell) and stiffener, fasteners and sealing material
13	Certification	All the testing / heat treatment shall be in accordance to API 6 H standards (Latest Edition)
14	Marking	Name of manufacturer, year of manufacture, purchase order number, size, pressure class etc should be engraved on the body of leak clamp. Size of clamp shall also be painted on body of the clamp.
15	Lifting hooks	All leak clamps shall be provided with lifting hooks for handling of the clamps. 2 nos. of hooks on each half of sleeve should be provided.
16	Packaging	Packaging shall be done in such a way that these can be preserved in Original as new condition.

D) SPECIFIC INFORMATION:

Sl. No.	Description	Remarks
1.	The fittings shall be inspected at vendor's works and raw material at the pipe/plate supplier's mill/outside laboratory of repute.	1. Chemical composition and Mechanical properties shall be checked for base metal as per relevant material standards and this specification, for each heat of steel/materials and drawing of sample & testing shall be witnessed by TPI (Third party Inspection) and/or Owner. 2. Chemical composition and Mechanical properties shall be checked for fasteners and sealing material (BUNA-N) as per relevant material standards and this specification. 3. If required, chemical composition and mechanical properties may be verified/rechecked at third party lab and shall be witnessed by owner and/or TPI. All incidental costs shall be borne by supplier. 4. Tensile, yield, elongation, chemical composition & Hardness value to meet the material specification. 5. Plates used for fittings shall be ultrasonically examined for lamination in accordance with ISO12094. Acceptance level B1 for the body, and E1 for the longitudinal edges. Vendor shall arrange test arrangements. 6. When fittings of size>18" NB are manufactured, the fitting of each diameter and wall thickness shall be ultrasonically checked for sufficient wall thickness in areas where minimum wall thickness is expected.
2	Physical Dimensional Check	1. Visual inspection-100% Witness by TPI (Third party inspection) and/or Owner. 2. Physical Dimensional Check shall be witnessed 100 % by TPI (Third party inspection) and/or Owner.
3	Ultra sonic testing of weld ends for lamination/cracks /other defects up-to a length of 50 mm	Ultrasonic Testing--Random Witness by TPI (Third party inspection) and/or Owner. • All weld ends shall be 100 % ultrasonically tested for laminations and crack up-to a length of 50 mm. • Lamination/Cracks/other defects shall not be acceptable. Weld repair on bevel end is not permitted.
4	Final documentation check	Review

E) DRAWING:

FIGURE 1: Standard Drawing of encapsulated leak clamp



Note: The numbers 1 to 8 have been detailed in Table-2 for Bill of Material.

Table 1- DIMENSIONS DETAILS FOR HIGH PRESSURE LONG SEAL LEAK CLAMPS

Pipeline Size (OD) (ΦD in inch)	Class	Min Length of clamp (inch)	Min Sealing width (inch)	Dimension of dome in inch (Φd x HT)
16"	900	24	18	12" NB ID x 14" Height
18"	900	24	18	12" NB ID x 14" Height
30"	600	30	24	12" NB ID x 14" Height

**** Tolerance +/- 3mm**

Table 2- BILL OF MATERIAL

Sr. No.	DESCRIPTION	MATERIAL	REMARKS
01	SPLIT BODY SHELL	ASTM A 516 GR 70	
02	STIFFNERS	ASTM A 105	
03	STUDS	ASTM A193 GR B7	
04	NUTS	ASTM A 194 GR 2H	
05	SEALING GASKET	BUNA 'N'	
06	LIFTING HOOK	ASTM A 516-70	
07	BRANCH PIPE	ASTM A 106 Gr B	
08	CAP	ASTM A 234 GR. WPB	

COMPLIANCE TO SPECIFICATION:

- All material shall be complying with pressure class of the pipeline (600 or 900 or as per pipe specification).
- The bidder should comply with the specification in totality and in token of confirmation the bidder shall return a copy of specification duly signed & endorsed.
- Any remark by the bidder in respect of specification shall be mentioned herein below with proper reference to the clause and appropriate reason for the same.
- Any remark directly or indirectly on the specification by the bidder made elsewhere in the offer shall not be considered by the owner.

Note: Following requirements to be fulfilled by the parties:-

1. Approval for QAP and manufacturing procedure, drawing of leak clamp, design of each clamp, Material test certificates before start of production / manufacturing.

TECHNICAL SPECIFICATIONS FOR LEAK REPAIR CLAMPS

Sl. No.	Description	Split sleeve type leak clamp assembled with studs, nuts and best quality seating material whole body as per the specification mentioned below:-	Bidder's Response (Mark "Tick" at your option)		
			Agree	Disagree	Seek Deviation
1	Design	As per API6H			
2	Service/Product to be handled	Crude Oil / Petroleum Products			
3	Size	Suitable for fixing on Spiral / Longitudinal weld pipe of grade as per table 1 & 2.			
4	Duty	Crude/ Product as per table 1 & 2			
5	Body	i. Carbon steel plates of weldable quality (Carbon maximum – 0.25%), ii. Shell – ASTM A 516 Gr. 70, iii. Stiffener – ASTM A105 as per International norms. iv. Longitudinal length of leak clamp should be minimum as per table 1 & 2.			
6	Studs	i. Alloy steel weld able conforming to ASTM A193- B7 / EN- 19 (minimum 7 nos. studs on either side). Preferable size stud (Diameter) should be 7/8". ii. Studs length 4 nos. (Two on each side) should be 12 inch length and balance 9 inch length.			
7	Nuts	i. Alloy steel weld able quality confirming to ASTM A194 Gr. 2H/ EN- 8 ii. Spot facing of the nut seal shall be carried out and no washer shall be used for tightening the nuts.			
8	Seating Material	i. There shall be sealing ring groove of appropriate size on the inner side of the leak clamp body on periphery of clamp. The moulded rubber shall cover the groove and covered surface between groove. ii. Best quality "Buna N" rubber packing material approximately 6 mm thick shall be used. The minimum thickness of packing material on surface of body & outside of groove may be 3 – 4 mm. iii. Shelf life of complete material should be minimum 4 year (confirmation is required from bidder in writing) iv. The Seal Material of Clamp shall be suitable for hydrocarbon with following specifications:- a. MATERIAL :BUNA N b. SHORE HARDNESS: 80 $^{+}$/- 5 A c. TENSILE STRENGTH: 150 KG/CM^2 MINIMUM d. ELONGATION AT BREAK: 150% MINIMUM.			

		e. COMPRESSION SET: 15% MAX. **v. Sealing material shall be installed in a single unit without any joint(s) whatsoever for half leak clamp. No joint/overlapping of sealing material will be acceptable in any half leak clamp.**			
9	Edge Preparation	i. Edge as per ASME B -31.4 shall be done to be welded including nuts & studs of leak clamp. ii. The circumferential ends shall be chamfered (approx 45 deg.) down to thickness of the pipe (i.e. 0.281") as per ASME B 31.4, section 451.6.2 I 6.			
10	Hydrotest Pressure	152 kg/ cm^2 for 600 Series at ambient temp. 228.0 kg/cm^2 for 900 series at ambient temp. The sheets shall be replaced upon completion of hydro test. Testing shall be carried out in presence of Owner's representative and/or TPI. No visual bulge shall be accepted during hydro test.			
11	Finishing	Two coats of Zinc Silicate primer with minimum coating thickness of 100 micron uniformly applied on body (uncovered by seal) of the leak clamp.			
12	Others	Clamps to be painted with airless spray gun. Primer: Zinc Silicate – 75DFT, Intermediate Coat – MIO 50DFT, Top Coat – Epoxy Polyurethane – 40DFT			
13	Documents	**a. <u>With Bid</u>** i. Supply record indicating details of buyer, Purchase order, Payment receipt, Pressure rating, Size, Year of supply. ii. Compliance letter that fitting shall be manufactured as per specifications. iii. QAP **b. <u>Upon order</u>** i. Detailed drawing showing all dimensions i.e. overall length sealing length, sealing width, inside dia of the clamp of leak clamp, size of studs, size of nuts etc. ii. Torque for tightening the leak clamp, total weight of the leak clamp. iii. Material test certificate of plate (for shell) and stiffener, fasteners and seating material			
14	Certification	All the testing / heat treatment shall be in accordance to API 6 H standards (Latest Edition)			
15	Marking	Name of manufacturer, year of manufacture, purchase order number, size, pressure class etc should be engraved on the body of leak clamp. Size of clamp shall also be pained on body of the clamp.			

16	Lifting hooks	All leak clamps shall be provided with lifting hooks for handling of the clamps.			
17	Packaging	Packaging shall be done in such a way that these can be preserved in Original as new condition.			

SPECIFIC INFORMATION:

Sl. No.	Description	Remarks	Bidder's Response		
			Agree	Disagree	Seek Deviation
1.	The fittings shall be inspected at vendor's works and raw material at the pipe/plate supplier's mill/outside laboratory of repute.	1. Chemical composition and Mechanical properties shall be checked for base metal as per relevant material standards and this specification, for each heat of steel/materials and drawing of sample & testing shall be witnessed by TPI (Third party inspection) and/or Owner. 2. Chemical composition and Mechanical properties shall be checked for fasteners and seating material (BUNA-N) as per relevant material standards and this specification. 3. If required, chemical composition and mechanical properties may be verified/rechecked at third party lab and shall be witnessed by owner and/or TPI. All incidental costs shall be borne by supplier. 4. Tensile, yield, elongation, chemical composition & Hardness value to meet the material specification. 5. Plates used for fittings shall be ultrasonically examined for lamination in accordance with ISO12094. Acceptance level B1 for the body, and E1 for the longitudinal edges. Vendor shall arrange test arrangements. 6. When fittings of size>18" NB are manufactured, the fitting of each diameter and wall thickness shall be ultrasonically checked for sufficient wall thickness in areas where minimum wall thickness is expected.			
2	Physical Dimensional Check	1. Visual inspection-100% Witness by TPI (Third party inspection) and/or Owner. 2. Physical Dimensional Check shall be witnessed 100 % by TPI (Third party inspection) and/or Owner.			
3	Ultra sonic testing of weld ends for lamination/cracks /other defects up- to a length of 50 mm	3. Ultrasonic Testing--Random Witness by TPI (Third party inspection) and/or Owner. • All weld ends shall be 100 % ultrasonically tested for laminations and crack up-to a length of 50 mm. • Lamination/Cracks/other defects shall not be acceptable. Weld repair on bevel end is not permitted.			
4	Final documentation check	Review			

4. **COMPLIANCE TO SPECIFICATION:**
   a. The bidder should comply with the specification in totality and in token of confirmation the bidder shall return a copy of specification duly signed & endorsed.
   b. Any remark by the bidder in respect of specification shall be mentioned herein below with proper reference to the clause and appropriate reason for the same.
   c. Any remark directly or indirectly on the specification by the bidder made elsewhere in the offer shall not be considered by the owner.
   d. TPI Inspection cost shall be borne by the supplier.

Table 1- DIMENSIONS DETAILS FOR HIGH PRESSURE STANDRAD LEAK CLAMPS

Pipe Details						
Pipeline Size	**Length of clamp (Min)**	**Sealing width (Min)**	**Pressure class**	**Minimum Hydro test pressure**	**Service**	**Pipe grade**
inch	**inch**	**inch**		**(kg/sq.cm)**		
16”	24”	18”	900	228	Petroleum Product	API5LX70
18”	24”	18”	900	228	Petroleum Product	API5LX70
30”	30”	24”	600	152	Petroleum Product	API5LX65

** Tolerance +/- 3mm

Table 2: BILL OF MATERIAL			
Sr. No.	DESCRIPTION	MATERIAL	REMARKS
01	SPLIT BODY SHELL	ASTM A 516 GR 70	
02	STIFFNERS	ASTM A 105	
03	STUDS	ASTM A193 GR B7	
04	NUTS	ASTM A 194 GR 2H	
05	SEALING GASKET	BUNA ‘N’	

Note: Following requirements to be fulfilled by the Vendor:

1. Approval for QAP and manufacturing procedure, drawing of leak clamp, design of each clamp, Material test certificates before start of production / manufacturing.

Delivery Schedule: Complete material to be delivered in 4 months from the date of purchase order.