外部委託業者の募集

References: IO/26/MS/10035437/JGO

“Supply Contract for ITER Vacuum Vessel Pressure Suppression System Level Switches”

（ITER 真空容器圧力抑制システム用レベルスイッチの供給契約に関する市場調査）

IO 締め切り 2026 年 9 月 15 日（火）　　（JADA 締め切り 9 月 15 日（火））

〇前文

本技術仕様書は、技術要件の不可欠な一部を構成する「サービス及び物品供給に関する一般管理仕様書（GM3S）[AD-1]」と併せてお読みください。両文書の内容に相違または矛盾がある場合には、本技術仕様書の内容が［AD-1］に優先します。

〇目的

本書の目的は、VVPSS（真空容器圧力抑制システム）用レベルスイッチの設計、製造、試験および納入に関する要求事項を定めることです。

ITER 機構（IO）は、契約者が異なる技術方式を提案することを認めています。ただし、IO が採用するのは、現場設置型電子機器を含まない受動式（パッシブ）または機械式のレベルスイッチに限られます。

〇概要

真空容器圧力抑制システム（VVPSS）の主な機能は、真空容器内への冷却材流入が発生した場合に一次閉じ込め障壁の健全性を維持すること、および一次閉じ込め障壁が破損した場合に真空容器の動的閉じ込め機能を維持することです。VVPSS は、容器内での水漏えいや非凝縮性ガスの漏えいなど、さまざまな異常事象または事故時に真空容器内圧を制限するとともに、一次閉じ込め障壁が損なわれた場合に放射性物質の拡散を防止します。また、事故や異常事象時に真空容器内に存在する、あるいは生成される水素に起因する危険性を低減する役割も担っています。

VVPSS タンクは、事故時には常に過渡状態で運転されます。これらのタンクは、水素爆発後に生じる軽度の真空状態から圧力ピークに至る条件にさらされます。これらは原子力安全上重要な圧力容器として分類されており、蒸気凝縮および粉じん捕集において重要な役割を果たしています。

契約者は、自らの専門知識、保証可能なプロセス条件、要求性能、環境条件、そして何よりも本技術仕様書への適合性を踏まえ、これらのタンクに設置するレベルスイッチとして最適な技術方式を提案してください。最終的な設計は、IO との協議および承認を経て決定されます。

〇作業範囲

本仕様書は、ITER VVPSS 向けに調達される計装機器について、そのサイジング、材料グレード、製作、検査、試験、品質保証、機器認定およびその他の要求事項を定めるものです。

本技術仕様書に定める他のすべての要求事項に加え、契約者は、適用されるすべての要求事項を満足することが実証された VVPSS 機器を最終的に納入できるよう、必要な設計開発、認定活動および製

造活動のすべてについて責任を負います。

本仕様書の対象となる VVPSS 機器は、レベルスイッチです。

VVPSS プロジェクトの計画を考慮し、IO は本契約を段階的に実施することを想定しています。契約者は、認定済み機器を IO へ納入するという本仕様書の最終目的を達成するための提案を入札段階で提示してください。想定される段階は以下のとおりです。

- **Task 1：設計および認定**
  最初の段階では、本技術仕様書に定められた要求事項に基づき VVPSS 機器の設計を実施していただきます。契約者は、本書に規定されたすべての要求事項への適合性を実証しなければなりません。
  提案する技術ソリューションが十分に認定されていない場合には、IO との合意に基づく代表的な試作機を用いて認定活動を開始していただきます。
- **Task 2：製造準備**
  契約者は、本仕様書で定める要求事項に従い、VVPSS 機器の製造開始に必要な準備が整うよう、必要なすべての工程を完了しなければなりません。
- **Task 3：製造および試験**
  契約者は、VVPSS 機器を製造し、設計基準および本技術仕様書で要求されるすべての検査、認定および試験を実施しなければなりません。また、製造記録書類を完成させる必要があります。
- **Task 4：IO サイトへの納入**
  契約者は、VVPSS 機器の IO サイトへの納入準備および納入を完了し、本技術仕様書および設計基準で要求されるすべての文書を IO へ引き渡さなければなりません。

注記（NOTES）

- Task 1 の期間中には、技術ソリューションの確定および VVPSS 機器に影響を与える IO 設計（配管ルート、プロセススキーム、機器認定など）の成熟化を図るため、契約者と IO の間で複数回の技術協議を実施する予定です。
- 以下の 2 つの条件がともに満たされるまで、製造活動全体は保留となります。
  - 本仕様書に定める要求事項に従って、提案された技術ソリューションが完全に認定されていること。提案された技術ソリューションが認定基準を満たさない場合、IO は契約を中止する権利を留保します。
  - IO が MRR（Manufacturing Readiness Review：製造準備状況レビュー）を通じて製造開始を承認すること。

〇一般要求事項

供給範囲に含まれる各機器の品質分類は、[AD-2] に定められています。

品質区分が QC-1 に分類される機器については、重要な品質管理活動を実施する前に、IO の承認を取得しなければなりません。

本仕様書では、「特別工程」に該当する作業を明示しています。これらの特別工程については、作業を開始する前に、その手順書を IO へ提出し承認を受ける必要があります。

また、特別工程の実施結果に関する報告書は、製造記録書類に含めて提出しなければなりません。
（以下詳細は技術仕様書を参照ください）

〇供給の範囲
本節では、[AD-1] に定める契約実施要件に加え、本契約における具体的な作業範囲を定めます。
契約者は、本仕様書に示されたすべての適用要求事項を満たす機器を供給するための提案を提出しなければなりません。

1 供給範囲（Scope）

供給対象となるレベルスイッチの一覧は、[AD-2] に示されています。
契約者は、少なくとも以下の機器および付属品を供給しなければなりません。
レベルスイッチ（フランジ取付型、または各スイッチポイントごとに NC 接点を有する差圧（DP）スイッチ）
必要に応じてスチリングチューブ
スイッチから中継端子箱（ジャンクションボックス）までの短尺ケーブルおよびそのコネクタ（20 m）
必要に応じて信号モジュール、遠隔電子機器またはリレー（DIN レール取付可能なノーマルクローズ型）
メーカー推奨予備品一覧
なお、保温材（断熱材）は供給範囲に含まれません。
ケーブルの選定および設計は契約者の責任範囲とし、IO の要求事項に適合しなければなりません。ケーブルの選定にあたっては、IO ケーブルカタログ [AD-18] の適用が推奨されます。

一方で、現場のジャンクションボックスから遠隔設置される計装盤（キュービクル）までのケーブルは、IO の供給範囲に含まれます。

2 設計要求事項
2.1 レベルスイッチに関する一般要求事項

供給者は、現場設置型電子機器を含まない受動式または機械式のレベルスイッチであれば、いかなる

技術方式についても提案できます。
各機器に必要なスイッチポイント数は、[AD-2] の各機器ごとに定められています。
フランジ取付型の場合、IO は、1 台の機器で少なくとも 2 つのスイッチポイントに対応できる技術方式を求めています。

また、3 つのスイッチポイントが要求される機器において、提案する技術方式で 3 点の検出ができない場合には、契約者は必要なスイッチポイント数を満たすために追加のスイッチを供給しなければなりません。
レベルスイッチには、現場で使用する専用電源を必要としない構成を採用してください。

現場に設置される機器については、少なくとも IP65 の保護等級（[AD-2] 参照）を有していなければなりません。
また、信号処理用キュービクル内に設置される部品については、IEC 60529 [ACS-24] に従い、少なくとも IP20 以上 の保護等級を有していなければなりません。
（以下詳細は技術仕様書を参照ください）

〇文書管理

本契約において作成・提出するすべての文書は、以下の要求事項に従わなければなりません。

1 一般要求事項
すべての文書は、ITER 文書管理システム（IDM：ITER Document Management System）に提出しなければなりません。このために専用のプロジェクト領域が設けられます。

契約者が作成する文書は二か国語表記としても構いません。主言語は英語とし、副言語は契約者の使用言語とします。英語版の記載は、契約者言語版と同一の技術的意味を有していなければなりません。また、二か国語表記を採用する場合は、図面内のすべての記載に適用しなければなりません。

すべての文書は、電子スキャンおよび電子データからの再印刷に適した、背景濃度が均一で鮮明かつ判読可能な形式で作成しなければなりません。また、すべての文書は PDF 形式に加え、編集可能なネイティブ形式で提出しなければなりません。双方で合意した場合には、他の電子形式を使用することもできます。電子提出に加えて紙媒体を提出することも可能です。

本仕様で規定された品質要求を満たしていない文書は、IO によるレビューを受けることなく契約者へ返却され、修正および再提出を求められます。また、そのような文書の差戻しは、工程延長や費用増額を認める根拠にはなりません。

すべての文書には、IO が指定するフローセンサー／フロースイッチの機器番号と、契約者が付与する

部品番号を用いて機器および構成部品を識別しなければなりません。

契約者またはその下請業者が作成した文書、スケッチ、作業指示書等については、プロジェクト遂行のために必要な範囲で IO が複製または転載することがあります。これは「著作権表示」が付された文書にも適用されます。

文書に関する要求事項への適合責任は契約者にあります。この責任には下請業者が作成した文書も含まれます。また、この責任を他の下請業者へ委譲または移転することはできません。

契約者は、製作期間中に発生した変更を反映するよう完成図を更新しなければなりません。すべての完成図は、紙媒体およびネイティブ形式の両方で、機器出荷前に提出しなければなりません。

契約者は、自ら供給するすべてのフローセンサー、フロースイッチおよび付属品について、洗浄、起動、試験、運転および保守に必要なすべての文書を提供しなければなりません。

IO が契約者提出文書を承認した場合であっても、その承認は契約者が発注書上の義務を履行していることを保証または認証するものではありません。

IO からコメント付きで返却された文書について、契約者が何らかの理由により IO の指摘事項をすべて反映しない場合は、その理由を書面にて IO へ通知しなければなりません。

注記： 材料調達および製作開始の承認は、文書の承認状況とは別に、書面によって行われます。

契約者は、下請業者から提出された図面および文書について、自社の品質保証（QA）プログラムに基づいてレビューおよび承認を行った後、IO へ提出しなければなりません。IO と契約者による並行レビューがプロジェクト工程上有益である場合については、個別に検討されます。

製造開始承認の前に、すべての関連文書を IO へ提出し、レビューおよび承認を受けなければなりません。IO から承認を受けるまでは、材料の発注および製作を開始してはなりません。

〇作業実施場所

契約者は、自社の施設において本契約の作業を実施していただきます。
本契約の範囲において、ITER サイトで実施する作業は予定されていません。

〇プロジェクト管理

契約者は、契約締結（AOC：Award of Contract）後 5 営業日以内に、契約責任者（Contract Responsible Officer）を指名しなければなりません。当該責任者は、設計、製造、工場試験、据付、性能試験、工程管理、コスト管理、および紛争や不整合事項の解決を含む契約全体について責任を負

います。

また、契約者は、作業の各分野について責任を負う担当者を明確に定めなければなりません。

契約者の提案書には、プロジェクト実施体制の概要およびプロジェクトチームメンバーの経歴書（履歴書）を含める必要があります。

1 プロジェクトスケジュール

契約者は、GM3S 付録 II［AD-1］で提供されているテンプレートを使用して文書提出スケジュールを作成しなければなりません。

契約者は、各供給注文の受領後 10 営業日以内にプロジェクトスケジュールを提出しなければなりません。

このスケジュールには、契約者および下請業者が作成する仕様書、図面、手順書その他の関連文書について、IO への提出時期および IO による承認時期を適切に示さなければなりません。

少なくとも、各作業の開始日および完了日を含むタスク記述をスケジュールに記載しなければなりません。また、設計、調達、製作および工場試験の各段階について詳細な作業内訳を個別に示し、最終的に現場への納入予定日（Scheduled Jobsite Delivery Date）を明記しなければなりません。

プロジェクトスケジュールは、いかなる作業を開始する前にも IO へ提出し、承認を得なければなりません。

契約者は、他の顧客向けに既に契約済みまたは契約予定のサービス・製品供給によって生じる可能性のある工程上の競合について十分に考慮しなければなりません。

また、スケジュールからの逸脱が予想される場合は、その変更がマスタースケジュールへ与える影響を評価できるよう、速やかに IO へ通知しなければなりません。

2 納入成果物スケジュール

契約者は、本技術仕様書、GM3S［AD-1］および契約の履行に伴って生じるその他の要求事項に基づき必要となる文書およびデータを IO へ提出しなければなりません。

以下に示すスケジュールはあくまで目安ですが、契約者は定められた必要時期までに要求されるデータを提出し、最終的には供給範囲全体を完了・納入しなければなりません。

成果物	内容	予定期限
D1.1	キックオフ会議議事録	T0 + 3 日

成果物	内容	予定期限
D1.2	「契約関連文書」の承認	T0 + 1 か月
D1.3	「設計文書」の承認	T0 + 6 か月
D1.4（T1）	「認定文書」の承認	2027 年第 2 四半期（Q2 2027）

Task 1（設計・認定フェーズ）の完了

マイルストーン	内容	予定期限
ホールドポイント（T2）	製造準備状況レビュー（MRR）（7.11 節）の承認	T1 + 6 か月

Task 2（製造準備フェーズ）の完了

成果物	内容	予定期限
D3.1	FAT（工場受入試験）（7.13 節）の完了および FAT 報告書の承認	T2 + 12 か月
D3.2（T3）	製造記録書類の承認	T2 + 14 か月

Task 3（製造・試験フェーズ）の完了

成果物	内容	予定期限
D4.1	納入機器に対する IO の受入れおよび承認済み文書一式の引渡し	T3 + 1 か月

必要納期：2029 年

Task 4（IO サイトへの納入）の完了

〇納入

供給範囲に含まれる機器の輸送は、契約者の責任で実施しなければなりません。

輸送会社の選定は契約者の裁量によるものとし、契約者は納入場所までの輸送について責任を負います。

出荷前に、契約者は「Contractor Release Note」［AD-3］［AD-17］に基づきリリースノートを作成し、IO の承認を取得しなければなりません。

また、DRR（Delivery Readiness Review）に関する作業指示書［AD-7］に従い、各出荷予定日の少なくとも15営業日前までに、ネイティブ形式の品目別梱包リストおよび納入報告書を logistics.data@iter.org へ提出しなければなりません。

部材を切断して複数の部品を製作する場合には、識別表示（マーキング）をすべての部品へ引き継がなければなりません。

マーキング方法および手順は、「ITER Numbering System for Components and Parts」［AD-6］に従うものとします。IOは、詳細な「IO Component Identification Standard」と印刷用ラベル（QRコード）テンプレートを提供します。

出荷および納入は、Incoterms 2010（国際貿易取引条件）に基づいて実施します。

契約者は、供給対象機器を以下のITERサイトへ DAP（Delivered At Place：仕向地持込渡し） 条件で納入しなければなりません。

ITER Organization
Route de Vinon-sur-Verdon CS 90 046
13067 St Paul Lez Durance Cedex France

梱包完了後、契約者は納入報告書（Delivery Report）［AD-15］および梱包リスト（Packing List）［AD-16］を作成し、IOへ提出してレビューおよび承認を受けなければなりません。
契約者は、完全性宣言書（Declaration of Integrity）に署名および押印したうえでIOへ提出しなければなりません。完全性宣言書は納入報告書に含まれます。

〇特別管理要求事項

GM3S［AD-1］第6章に定められた要求事項を全面的に適用します。
契約者とIOは、作業の進捗確認および技術的課題の協議のため、定期的に会合を実施しなければなりません。
また、契約者またはIOは、課題解決のために必要に応じて個別の会議や連絡を要請することができます。
すべての会議はオンライン会議（ビデオ会議）形式で実施します。
契約者は、各会議の議事録を作成する責任を負います。議事録は正式発行前に全参加者へ配布し、レビューおよび承認を受けなければなりません。
契約者は、IOから割り当てられた各タスクに対応する成果物を所定の期限までに提出しなければなりません。これら成果物の内容は第12.2節に示されています。

【※ 詳しくは添付の英語版技術仕様書「**VVPSS Level Switches with remote electronics**」をご参照ください。】
ITER 公式ウェブ http://www.iter.org/org/team/adm/proc/overview からもアクセスが可能です。

「核融合エネルギー研究開発部門」の HP： http://www.fusion.qst.go.jp/ITER/index.html では ITER 機構からの各募集（IO 職員募集、IO 外部委託、IO エキスパート募集）を逐次更新しています。ぜひご確認ください。

イーター国際核融合エネルギー機構からの外部委託
に関心ある企業及び研究機関の募集について

＜ITER 機構から参加極へのレター＞

以下に、外部委託の概要と要求事項が示されています。参加極には、提案された業務に要求される能力を有し、入札すべきと考える企業及び研究機関の連絡先の情報を ITER 機構へ伝えることが求められています。このため、本研究・業務に関心を持たれる企業及び研究機関におかれましては、応募書類の提出要領にしたがって連絡先情報をご提出下さい。

china eu india japan korea russia usa
Route de Vinon-sur-Verdon - CS 90 046 - 13067 St Paul Lez Durance Cedex - France

To: Potential Suppliers

Ref: IO/26/MS/10035437/JGO

Subject: Letter of Invitation for the Market Survey on "Supply Contract for ITER Vacuum Vessel Pressure Suppression System Level Switches"

Dear Madam/Sir,

The ITER Organization (IO) launches a Market Survey and requests information from companies having the interest, knowledge and capacity related to the **Supply Contract for ITER Vacuum Vessel Pressure Suppression System Level Switches**.

Please note that this is not a Call for Nomination request, and the purpose of this survey is not to access and evaluate the capacity of your company. At this moment the ITER Organization (IO) is preparing a procurement strategy for this project. Therefore, we would appreciate very much if you will provide open and frank feedback, which will help the IO to better understand the real situation of the industry.

china
eu
india
japan
korea
russia
usa

You will find enclosed:

- Annex I: Technical Specification FHYCDN v1.5 with the datasheet FHXWSN v1.6;
- Annex II: Market Survey Questionnaire.

With this letter, we invite all potential companies, institutions or entities from ITER Member States to participate to this Market Survey. We also kindly invite the Domestic Agencies to publish this Market Survey on their websites or through other advertising methods, which will help to retrieve the requested information from a maximum of potential suppliers.

Please return a completed questionnaire using the template of Annex II, **no later than 15 September 2026**, to the Procurement Officer in charge Jingyu.Gao@iter.org, and cc Andrew.Brown@iter.org.

Many thanks in advance for your participation and co-operation.

Yours faithfully,

Jingyu GAO
Procurement Officer
Procurement Operational Delivery

Market Survey Questionnaire

Supply of the ITER Vacuum Vessel Pressure Suppression System (VVPSS) Level switches

Ref: IO/26/MS/10035437/JGO

Please note that this is not a Call for Nomination request, and the purpose of this survey is not to access and evaluate the capacity of your company. At this moment the ITER Organization (IO) is preparing a procurement strategy for this project. Therefore, we would appreciate very much if you will provide open and frank feedback, which will help the IO to better understand the real situation of the industry.

We invite all potential companies, institutions or entities from ITER Member States to participate in this Market Survey by returning a completed questionnaire **no later than 15 September 2026** to the Procurement Officer in charge Jingyu.Gao@iter.org, and cc Andrew.Brown@iter.org.

1. *General information about the company compiling the questionnaire*

Company Name: …….

Country of Origin: ……..……

Address: ……

Years in Operation: ……...

Main Activities and Products:

Main Activities/Products	*Description*
1.	
2.	
3.	

Representatives to be contacted:

Contact person	*Name + Title*	*Email address*	*Telephone*
Commercial Matters:			+
Technical Matters:			+

Are you currently registered in our ARIBA IPROC database? **You can find all links to proceed along with instruction going to: https://www.iter.org/fr/proc/overview.**

YES ☐ ***NO*** ☐

2. General questions

2.1 Are you familiar with ITER project and do you have any knowledge of ITER requirements and guidelines as described in the technical specification (Annex I)?

YES ☐ ***NO*** ☐

Please provide overview and/or any complementary information:

.....
.....
.....
.....

2.2 Are you certified ISO 9001 or equivalent?

YES ☐ ***NO*** ☐

Please specify your certifications:

QA Certifications	*Comments*	*Validity Period*

3. Questions related to the VVPSS level switches technical specification (Annex I)

3.1 Which technical solution do you think is the best fit to meet the level switch function in the VVPSS application? Can you share the datasheet of the proposed product?

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3.2 With the proposed product, how many switch set points can be achieved per instrument?

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3.3 For the mounting, the VVPSS tanks cannot be modified: the tanks are already installed and any modification would require an update to the ESPN dossier. Thus, we cannot add nozzles, we cannot increase the nozzles DN. We can however potentially accommodate a

different connection with a tapping on the bottom liquid line/ top gas line if required. The installation room of our system is very crowded, we cannot accommodate an external guide tube for the level measurement on the side of the tanks.
With this in mind, what are the mounting options and the process connection size/type of the proposed product? According to the rules described in the technical specification, can you propose a mounting option/ process connection type for which the ESPN requirements are not applicable?

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If the ESPN requirements are applicable, please indicate if you have experience being the regulatory manufacturer of "Pressure Accessories" with similar ESPN/PED class. IO can provide support.

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3.4 Is the proposed product suitable for the process conditions and normal/accidental ambient conditions? [design & ambient pressure, design & ambient temperature, moisture, hydrogen load in the process fluid]

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3.5 Is the proposed product a purely mechanical solution / a passive solution that has no integrated electronics? Is it compatible with the installation described in the technical specification: up to 300m cable length between the sensor in the field and the cubicle housing the signal module at a remote/sheltered location?

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3.6 Is the proposed product already qualified for the environment loads applicable at the VVPSS location? [magnetic field, radiation, neutron load]

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If NO, if the solution is purely mechanical /metallic, we do not expect the radiation and neutron load to be an issue and would say that the technical solution is inherently immune to those loads. For a magnetic switch, we may have an impact of the static and transient magnetic field present at the VVPSS location in normal and in accident conditions.
With this in mind, do you expect any impact of the environment loads on the product or can you confirm the product is inherently immune?

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If applicable, please indicate if you would be ready to engage the development and the necessary qualification activities to meet the requirements defined in the technical specification and under which conditions (time needed, IO engagement…). IO has an in-house certified magnetic field test facility and a neutron test program which will submit the prototypes to a tailored neutron load matching the VVPSS requirements.

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3.7 Is the proposed product already qualified for the seismic load applicable at the VVPSS location?

If YES, please provide the seismic spectrum to which it has been qualified and the report/project references:

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If NO, do you have the inhouse capacity to perform seismic analysis on the proposed solution and the functional seismic test if applicable? Do you need support from IO?

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3.8 With the proposed product, what is the expected accuracy and response time?

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3.9 Do you see technical difficulties to satisfy any requirements within the technical specification? We may find the opportunity to reformulate the specification or to adapt the solution.

YES ☐ ***NO*** ☐

If YES, please identify the main risks in following table with proposed remedial actions.

Technical difficulties from the specification	***Reference to the section in the technical specification***	***Technical risk***	***Proposal to overcome the risk***

4. Feedback on commercial aspects

4.1 The supply contract will be organized with hold-points and a flexibility on the start date of the manufacturing phase. The design and qualification phase would start in Q4 2026. The delivery of the final equipment is required in 2029. We want to sign a contract with agreed prices with that schedule. Ideally you should have capacity within this timeframe. Could you please provide a tentative planning including the following milestones: manufacturing preparation (documentation/procedure/material procurement), manufacturing, factory testing and shipping?

Deliverable	***Description***	***IO estimated due date***	***Proposal from suppliers***
D1.1	*Kick-off meeting minutes*	*T0 +3 days*	
D1.2	*Approval of documents related to the "Contract documentation"*	*T0 + 1 month*	
D1.3	*Approval of documents related to the "Design documentation"*	*T0 + 6 months*	
D1.4 (T1)	*Approval of the "Qualification documentation"*	***Q2 2027***	
Completion of Task 1 – Design & Qualification Phase			
***Hold Point** (T2)*	*Approval of the "Manufacturing Readiness Review" (Section 7.11)*	*T1 + 6 months*	
Completion of Task 2 – Manufacturing Readiness			
D3.1	*Completion of the FAT (Section 7.13) Approval of the FAT report*	*T2 + 12 months*	

D3.2 (T3)	*Approval of the Manufacturing Dossier*	*T2 + 14 months*	
Completion of Task 3 – Manufacturing and Testing			
D4.1	*IO acceptance of the delivered equipment and handover of the complete approved documentation*	*T3 + 1 month* ***Need date 2029***	
Completion of Task 4 – Delivery to IO site			

T0 = Commencement Date of the Contract

4.2 Project Cost

Please provide your non-binding cost estimation in the following format. The target uncertainty of the estimation should be within +/-15%. The information will help the IO to estimate the level of the market prices. It is requested from the potential suppliers to segregate the costs related to:

- *Design and qualification package,*
- *Manufacturing preparation,*
- *Manufacturing and testing,*
- *Delivery/transportation to ITER site.*

All prices shall be in Euros (€) net of all duties and taxes. As an international organization the ITER Organization is exempt from all taxes and duties. The Supply shall be delivered on the basis of DAP Incoterms 2020, Saint Paul les Durance-France.

Item	***Tag***	***Design and qualification cost €***	***Manufacturing preparation cost €***	***Manufacturing and testing cost €***	***Delivery/transportation cost €***	***Sub-total cost for each item €***
1	24VPHM-MLS-8155					
2	24VPHM-MLS-8055					
3	24VPHM-MLS-8073					
4	24VPHM-MLS-8072					
5	24VPHM-MLS-8081					
6	24VPHM-MLS-8181					
7	24VP00-MLS-8014					
8	24VP00-MLS-8024					
9	24VP00-MLS-8034					
10	24VP00-MLS-8044					
11	24VPHM-MLL-8091					
12	24VPHM-MLH-1250					
					Total cost estimation for the supply €	

5. General comments

5.1 How do you rate the probability of your company tendering for this contract?

LOW ☐ ***MEDIUM*** ☐ ***HIGH*** ☐

If LOW or MEDIUM, please identify and explain the reasons/showstoppers for your company to participate in the project:

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5.2 In your opinion, what sort of contract type would be best for implementing the work and give your reasons as to why you think this contract type has advantages over any other type?

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5.3 Please indicate any other information that may be relevant for this market survey.

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.....
.....

Signature: COMPANY STAMP

Name: .....

Position: .....

Tel: .....

Date: .....

	REV ↓	Model #	Process pressure range kPa(a)		Process temperature range ° C		Switch LOW	Switch HIGH
			min	max	min	max	mm	mm
1	1.4	MLS1	70	100	6	60	2654	3163 – 3063
2	1.4			(1bar)				
3	1.4	MLS2	70	100	6	60	361	1855 – 1955
4	1.4			(1bar)				
5	1.6	MLS3	7.5	200	6	130	1836	1936
6	1.6			(2bar)				
7	1.6	MLS4	7.5	200	18	130	2488	2588
8	1.6			(2bar)				
9	1.4	MLS5	70	100	6	60	1270 – 1370	1861
10	1.4			(1bar)				
11	1.4	MLL1	70	100	6	35	62	N/A
12	1.4			(1bar)				
13	1.6	MLH1	86	200	6	130	N/A	water detection
14	1.6			(2bar)				

VVPSS Level Switch datasheet
SUMMARY

Switch HIGH HIGH	Height between top and bottom switch points	Est. height nozzle to tank bottom	Height available above tank nozzle for installation	Burst pressure requirement	Design temperature
mm	mm	mm	mm	bar(g)	degC
4261	1607	4748	400	9	130
2832	2471	3353	1900	9	130
2336	100	4061	900	15	130
2988	100	4061	900	15	130
2061	791	2558	2300	9	130
N/A	N/A	802 – to be confirmed	1300	9	130
N/A	N/A	100 – to be confirmed	N/A	0.5	130

	Document Nº	FHXWSN
	Revision Nº	1.6
	Page Nº	2

Enclosure protection requirement	Process connection type	Quantity of items to be supplied if the required number of switch points can be accomodated per item. If NOT, the scope includes as many items necessary to provide the required switch points.
IP65	flanged DN50 or VCR fittings	2
IP65	flanged DN50 or VCR fittings	2
IP65	flanged DN50 or VCR fittings	1
IP65	flanged DN50 or VCR fittings	3
IP65	flanged DN50 or VCR fittings	2
IP65	flanged DN50 or VCR fittings	1
IP65	To be advised	1

Total	12

Comments
To be included in the scope if the supplier can propose a suitable technology

IDM UID

FHYCDN

VERSION CREATED ON / VERSION / STATUS

22 Jul 2026 / 1.5 / Approved

EXTERNAL REFERENCE / VERSION

Technical Specifications (In-Cash Procurement)

VVPSS Level Switches with remote electronics - Technical specification

This specification defines the technical requirements for the design, manufacturing, testing, equipment qualification and delivery of the full set of level switches for the Vacuum Vessel Pressure Suppression System (VVPSS). The datasheet is provided in ITER_D_FHXWSN.

SUPPLY

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REVISION TRACKING: VERSION 1.5

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1 Preamble

This Technical Specification is to be read in combination with the General Management Specification for Service and Supply (GM3S) [AD- 1] that constitutes a full part of the technical requirements. In case of conflict, the content of the Technical Specification supersedes the content of [AD- 1].

2 Purpose

The Purpose of this document is to define the design, manufacture, testing and delivery requirements for the VVPSS level switches. IO is open to the Contractor proposing different technologies. IO will select exclusively passive/mechanical switches with no in-field electronics.

3 Introduction

The main functions of the Vacuum Vessel Pressure Suppression System (VVPSS) are to maintain the integrity of the primary confinement barrier in the event of ingress of coolant into the vacuum vessel and to maintain dynamic confinement of the vacuum vessel in the event of rupture of the primary confinement barrier. The VVPSS limits the vacuum vessel's internal pressure in case of various incidents or accident events (in-vessel leak of water or non-condensable gas) together with preventing the dispersion of radioactive materials in case of breach of the primary confinement barrier. The VVPSS mitigates the hazard associated with hydrogen that is contained or formed in the vacuum vessel during an incident or accident event.

The VVPSS vessels operates during accidents, always in transient conditions. They see mild vacuum to pressure peaks following hydrogen explosions. They are nuclear classified pressure vessels, with a key role in steam condensation and dust capture. The Contractor shall advise the best suited technology for the level switches installed on these tanks according to their expertise, the guaranteed process conditions, the required performances, the environment conditions and above all to be compliant with this technical specification. The ultimate design will be decided in agreement and upon validation by IO.

4 Scope of the work

This specification defines the sizing, material grades, fabrication, inspection, examination, testing, QA, qualification and other requirements for the instruments, procured for the ITER VVPSS. Above all other requirements of this technical specification, the Contractor shall be responsible for all necessary design development, qualification and manufacturing activities that ultimately enable the delivery of the VVPSS instruments that have been demonstrated to fulfil all the applicable requirements.

The VVPSS instruments covered in this specification are the level switches.

Due to the VVPSS planning, IO foresees a staged approach to execute this Contract. The Contractor shall present a proposal to meet the ultimate goal of this specification at the tender stage, which is the delivery to IO of qualified instruments. The following stages are foreseen:

- Task 1: Design & qualification – The first task is dedicated to the design of the VVPSS instruments based on the requirements defined in this technical specification. The

Contractor shall demonstrate compliance with all the requirements specified in this document. If the proposed solution is not fully qualified, the Contractor shall start qualification activities on representative prototypes, agreed with IO.

- Task 2: Manufacturing Preparation – The Contractor shall complete all steps to achieve manufacturing readiness of the VVPSS instruments in line with the requirements defined in this specification.
- Task 3: Manufacturing and Testing – The Contractor shall manufacture the VVPSS instruments and perform all the necessary inspections, qualifications and testing required by the design codes and this technical specification. The Contractor shall complete the Manufacturing dossier.
- Task 4: Delivery to the IO site - The Contractor shall prepare and complete the delivery of the VVPSS instruments to the IO site and hand over all the documentation required by this technical specification and design codes to IO.

NOTES:

- Several exchanges are foreseen between the Contractor and the IO during Task 1 to settle the technical solution and to achieve maturity of the IO design impacting the VVPSS instruments (Line routing, Process Schematic, Qualification of Equipment)
- The full manufacturing activity will be ON HOLD until both conditions are met:
  - the technical solution is fully qualified as per the requirements defined in this specification. Shall the technical solution not meet the qualification thresholds, IO reserves the right to stop the contract.
  - IO approves the launch of manufacturing activities via an MRR.

5 Acronyms & Definitions

5.1 Acronyms

The following acronyms are the main one relevant to this document.

24VP00 Vacuum Vessel Pressure Suppression System

24VPHM Hydrogen Mitigation System

ACS Applicable Code and Standards

AD Applicable Document

AOC Award Of Contract

ASME American Society of Mechanical Engineers

ASN Autorité de Sûreté Nucléaire et de Radioprotection (French Nuclear Safety Authority)

ASTM American Society for Testing and Materials

CRO Contract Responsible Officer

DAP Delivery At Place

DRR Delivery Readiness Review

DTR Drain Tank Room

ENF Equivalent Neutron Fluence

ESP Equipements Sous Pression (Pressure Equipment)

ESPN Equipements Sous Pression Nucléaire (Nuclear Pressure Equipment)

ESR Essential Safety Requirement

FAT Factory Acceptance Test

SUPPLY

GM3S General Management Specification for Service and Supply

HRA Hazard and Risk Analysis

ICE Ingress of Coolant Event

IDM UID IO Document Management system Unique Identifier – Unique reference number for IO documents

INB Installation Nucléaire de Base (Basic nuclear installation)

IO ITER Organization

ISO International Organization for Standardization

LOCA Loss Of Cooling Accident

LOVA Loss of Vacuum Accident

MIP Manufacturing and Inspection Plan

MLL/MLH ITER Functional Number for Level Switches Low / High

MLS ITER Functional Number for Level Switches

MRR Manufacturing Readiness Review

MTO Material Take Off

NCR Non-Conformity Request

NDE Non-Destructive Examination

NDT Non-Destructive Test

NPMA Nuclear Particular Material Appraisal

NQA Nuclear Quality Assurance

PED Pressure Equipment Directive (equiv. ESP)

PIA Protection Important Activity

PIC Protection Important Component

PRO Procurement Responsible Officer

PS Maximum Allowable Pressure

PTC Performance Test Code

PWHT Post-Weld Heat Treatment

QA Quality Assurance

QC Quality class

QP Quality Plan

RL Relief Lines

SC Seismic Category

SIC Safety Importance Class

SRD System Requirement Document

SSPC Steel Structures Painting Council

TCWS Tokamak Cooling Water System

TID Total Ionizing dose

TNF Total Neutron Flux

VST Vapour Suppression Tank

VV ITER Vacuum Vessel

VVPSS Vacuum Vessel Pressure Suppression System

WPS Welder Procedure Specification

5.2 Definitions

Contractor: shall mean an economic operator who have signed the Contract in which this document is referenced.

6 List of applicable and reference documents

6.1 References internal to IO

The design conditions of the instruments are taken from several internal IO documents. The necessary sizing data for the Contractor have been extracted by IO from those documents and are highlighted in this technical specification. These documents are listed in this section to enable clarity and changes tracking for IO but will not and need not be shared with the Contractor.

[IO-1] Radiation Maps During Plasma Operations (Mode-0), extracted data – IDM UID RJLLFY v2.1

[IO-2] Safety requirement Room book – IDM UID KF63PB v2.17

[IO-3] Static and transient magnetic field maps at level L1 tokamak complex – IDM QQEB3J v1.2

[IO-4] ESTM-57 EFE Signal conditioners SMF test procedure – IDM UID BGKGDU v1.1

[IO-5] Technical Specification: Framework Supply Contract for SCWS-TCWS I&C cubicles – IDM UID 3YV4V5 v1.2

[IO-6] VVPSS Non-safety IO list – IDM UID BK89B6 v1.2

[IO-7] VVPSS safety IO list – IDM UID BJZPVE v1.2

[IO-8] Vapour Suppression Tanks P&IDs – IDM UID 4CSLSL vI

[IO-9] VVPSS HMS P&IDs – IDM UID 5PVPZU vH

[IO-10] VVPSS Relief Pipes P&IDs – IDM UID 5PVJYK vH

[IO-11] Loads Case Specification VVPSS -RL – IDM UID UXX829 v2.7

[IO-12] Design Seismic Floor Response Spectra in the Tokamak Complex + annex– IDM UID SVBRJZ v1.1

[IO-13] SL-3 Floor Response Spectra for Tokamak Complex – IDM UID SFSN7Q v2.0

[IO-14] Tokamak Complex - Floor Response Spectra 2016 -Esteyco – IDM UID TFN4DN v1.3

[IO-15] Suitability of B11, B14 & B74, anticipated after the implementation of PCR-755 and its daughter PCRs – IDM UID UX5RXG v1.9

[IO-16] Thermal analysis for passive fire protection of the VVPSS lines – IDM UID 4XYEJG v1.1

[IO-17] B11 & B74 - Requirements for Fire sensitive system – IDM UID 3VSJHD v1.1

[IO-18] System Requirement (SRD) Document SRD-24-VP (VVPSS) – IDM UID 28B2U6 v6.3

[IO-19] PBS 24 VVPSS for Defined Requirements – IDM UID Q9DVN3 v2.1

[IO-20] Allowable values and limits in service level C and D for ITER mechanical components – IDM UID 3G3SYJ v3.1

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6.2 Applicable Documents & Codes and standards for the Contractor

6.2.1 Applicable Documents

This is the responsibility of the Contractor to identify and request for any documents that would not have been transmitted by IO, including the below list of reference documents.

This Technical Specification takes precedence over the referenced documents. In case of conflicting information, this is the responsibility of the Contractor to seek clarification from IO.

Upon notification of any revision of the applicable document transmitted officially to the Contractor, the Contractor shall advise within 4 weeks of any impact on the execution of the contract. Without any response after this period, no impact will be considered.

[AD- 1] General Management Specification for Service and Supply (GM3S) – IDM UID 82MXQK v1.4
[AD- 2] VVPSS Level Switch Datasheet - IDM UID FHXWSN v1.6
[AD- 3] Quality Requirements for IO Performers – IDM UID 22MFG4 v6.4
[AD- 4] Instruction for Seismic Analysis – IDM UID VT29D6 v2.1
[AD- 5] Radioprotection guide for ESPN application – IDM UID 2LTQ96 v2.5
[AD- 6] ITER Numbering System for Components and Parts – IDM UID 28QDBS v5.1
[AD- 7] Working Instruction for the Delivery Readiness Review (DRR) – IDM UID X3NEGB v3.0
[AD- 8] Working Instruction for Manufacturing Readiness Review – IDM UID 44SZYP v5.1
[AD- 9] Software Qualification Policy – IDM UID KTU8HH v2.0
[AD- 10] Requirements for DA / Supplier / Subcontractors Deviations & Nonconformities – IDM UID 22F53X v10.3
[AD- 11] Overall supervision plan of the chain of suppliers for Safety Important Components, Structures and Systems and Safety Related Activities – IDM UID 4EUQFL v8.2
[AD- 12] List of ITER–INB Protection Important Activities – IDM UID PSTTZL v2.2
[AD- 13] Propagation of the Defined Requirements for Protection Important Components Through the Chain of External Interveners – IDM UID BG2GYB v3.3
[AD- 14] Specification for Labelling of Equipment on ITER Project – IDM UID TL25DK v3.3
[AD- 15] Delivery Report Template – IDM UID WZPYVZ v3.0
[AD- 16] Package & Packing List Template – IDM UID XBZLNG v2.2
[AD- 17] Release Note Template – IDM UID QVEKNQ v3.1
[AD- 18] IO cable catalogue – IDM UID 355QX2 v6.13
[AD- 19] Plant Control Design Handbook – IDM UID 27LH2V v7.1
[AD- 20] Plant Control Design Handbook for Nuclear Control System – IDM UID 2YNEFU v5.0
[AD- 21] Qualification Guidelines – IDM UID WGFF3G v1.0
[AD- 22] ITER Policy on EEE in Tokamak Complex – IDM UID 6ZX6S3 v3.6
[AD- 23] MQP L3 Procedure for Qualification of Protection Important Components (PIC) – IDM UID: XB5ABP v2.1
[AD- 24] Guidelines for Qualification by Analysis – IDM UID: AKFUMQ v1.2
[AD- 25] Guidelines for qualification of mechanical equipment – IDM UID: ADCXXD v1.0

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[AD- 26] Guidelines for qualification of electrical and I&C equipment – IDM UID: ADD99Y v1.0
[AD- 27] Guidelines for qualification of I&C System and Software – IDM UID: AHNMBK v1.0
[AD- 28] Procedure for Analyses and Calculations – IDM UID: 22MAL7 v6.8
[AD- 29] HOW TO - Commercial Grade Dedication for ITER – IDM UID: 6MKCJ6 v1.0
[AD- 30] Template for Qualification Plan – IDM UID: B9HR4D v1.0
[AD- 31] Template for Qualification Synthesis Report – IDM UID: BXTDJE v1.0
[AD- 32] Template for Qualification Dossier – IDM UID: BXTPJP v1.0
[AD- 33] Template for Qualification Preservation Sheet – IDM UID: BXTLMX v1.0
[AD- 34] Template for Reference File – IDM UID: BXTMAL v1.0
[AD- 35] MQP L3 WI for Manufacturing and Inspection Plan – IDM UID: UKQG8M v1.7
[AD- 36] List of manufacturing documents to be prepared and stored for PE and NPE – IDM UID WDBC7H v2.7
[AD- 37] Implementation Plan for PE/NPE cat 0 or I – IDM UID YWDJW2 v1.3
[AD- 38] Template of Instructions Manuals of PE/NPE – IDM UID XYECVY v1.0
[AD- 39] 2D drawings of PST Tank – IDM UID: 5N5JT5 v1.8
[AD- 40] 2D drawings of QEN Tank – IDM UID: 5MKFD3 v1.7
[AD- 41] 2D drawings of OFT Tank – IDM UID: 5L7X24 v1.6
[AD- 42] 2016034-0100-0902 - Manufacturing Drawings – Vapour Suppression Tank 1 – IDM UID: U8U3B3 v1.13
[AD- 43] 2016034-1000-1600 - Manufacturing Drawings – Vapour Suppression Tank 2 – IDM UID: UAN7B7 v1.12
[AD- 44] 2016035-1000-1600 - Manufacturing Drawings – Vapour Suppression Tank 3 – IDM UID: UAQKP8 v1.12
[AD- 45] 2016035-0100-0900 - Manufacturing Drawings – Vapour Suppression Tank 4 – IDM UID: UAQAMD v1.13
[AD- 46] Cooler condenser drawing – preliminary (file attached to specification)
[AD- 47] Implementation plan for design & manufacture of PE/NPE – IDM UID VE2DSP v5.0
[AD- 48] 2016034-0000-1-5 - General Arrangement Drawing - Vapour Suppression Tank 1 and 2 – IDM UID: TXQLGD v1.12
[AD- 49] 2016035-0000-1-5 - General Arrangement Drawing - Vapour Suppression Tank 3 and 4 – IDM UID: TXQL3W v1.13
[AD- 50] Static and transient magnetic field maps at level B1 tokamak complex – IDM UID QDFMW9 v1.2
[AD- 51] Static and transient magnetic field maps at level B2 tokamak complex – IDM UID QE42YB v1.2

6.2.2 Applicable Codes and Standards

This is the responsibility of the Contractor to procure the relevant Codes and Standards applicable to that scope of work. The codes and standards that shall be used in this contract are listed in the table below. The use of other standards may also be acceptable, subject to IO's approval. The Contractor shall demonstrate conformity with the orders, directives, codes and standards in their last version.

For items not covered by the proposed codes and technical specifications, the Contractor shall justify the soundness of the design approach.

SUPPLY

[ACS- 1] ASME NQA-1:2024 - Quality Assurance Requirements for Nuclear Facility Applications
[ACS- 2] EN 10204:2004 - Metallic products – Type of inspection documents
[ACS- 3] ISO 17025:2017 - General requirements for the competence of testing and calibration laboratories
[ACS- 4] ISO 9712:2021 - Non-destructive Testing - Qualification and Certification of NDT Personnel
[ACS- 5] IEC 60068-3-3:2019 - Seismic test methods for equipment
[ACS- 6] EN 13480:2024 Metallic industrial piping
[ACS- 7] IEC 61513:2013 Nuclear power plants - Instrumentation and control important to safety - General requirements for systems
[ACS- 8] IEC 62671:2013 Nuclear power plants - Instrumentation and control important to safety - Selection and use of industrial digital devices of limited functionality
[ACS- 9] EN 3834:2024 Quality requirements for fusion welding of metallic materials
[ACS- 10] EN 15614:2025 Specification and qualification of welding procedures for metallic materials – Welding procedure test
[ACS- 11] ISO 9692:2016 Welding and allied processes — Types of joint preparation
[ACS- 12] EN 2516:2024 Aerospace series - Passivation of corrosion-resisting steels and decontamination of nickel base alloys
[ACS- 13] SSPC-1:2016 Solvent Cleaning
[ACS- 14] SSPC-2:2024 Hand Tool Cleaning
[ACS- 15] SSPC-5:2015 White Metal Blast Cleaning
[ACS- 16] SSPC-10:2024 Near-White Metal Blast Cleaning
[ACS- 17] EN 17637:2022 Non-destructive testing of welds - Visual testing of fusion welded joints
[ACS- 18] EN 17636:2013 Non-destructive testing of welds - Radiographic testing - Part 1: X- and gamma-ray techniques with film
[ACS- 19] ISO 10675-1:2016 Non-destructive testing of welds — Acceptance levels for radiographic testing — Part 1: Steel, nickel, titanium and their alloys
[ACS- 20] EN 11666:2018 Non-destructive testing of welds - Ultrasonic testing - Acceptance levels
[ACS- 21] EN 17640:2018 Non-destructive testing of welds — Ultrasonic testing — Techniques, testing levels, and assessment
[ACS- 22] EN 9606-1:2017 Qualification testing of welders – Fusion welding – Part 1: Steels
[ACS- 23] ASTM A262-15:2021 Standard Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels
[ACS- 24] IEC 60529:1992 Degrees of protection provided by enclosures (IP Code)
[ACS- 25] NF C32-070:2001 Insulated cables and flexible cords for installations - Classification tests on cables and cords with respect to their behaviour to fire
[ACS- 26] IEC 60332:2005 Tests on electric and optical fibre cables under fire conditions
[ACS- 27] IEC 61034:2005 Measurement of smoke density of cables burning under defined conditions
[ACS- 28] IEC 60754:2014 Test on gases evolved during combustion of materials from cables
[ACS- 29] IEC 60331:2019 Tests for electric cables under fire conditions - Circuit integrity
[ACS- 30] IEEE 383:2015 Standard for Qualifying Electric Cables and Splices for Nuclear Facilities

SUPPLY

[ACS- 31] IEC 60544:2014 Electrical insulating materials - Determination of the effects of ionizing radiation on insulating materials
[ACS- 32] NF EN 1991-1-2:2003 paragraph 3.2.1 “standard temperature-time curve”
[ACS- 33] IEC 61226:2021 Nuclear power plants - Instrumentation, control and electrical power systems important to safety - Categorization of functions and classification of systems
[ACS- 34] IEC 62138:2019 Nuclear power plants - Instrumentation and control systems important to safety - Software aspects for computer-based systems performing category B or C functions
[ACS- 35] IEC 60880:2010 Nuclear power plants - Instrumentation and control systems important to safety - Software aspects for computer-based systems performing category A functions
[ACS- 36] NF EN IEC 61000: 2019 Electromagnetic compatibility (EMC)
[ACS- 37] EN 1092-1:2018 Flanges and their joints – Circular flanges for pipes, valves, fittings and accessories PN designated – Part 1: Steel flanges.
[ACS- 38] EN 1515-4:2021 Flanges and their joints - Bolting - Part 4: Selection of bolting for equipment subject to the Pressure Equipment Directive 2014/68/EU
[ACS- 39] ASME B18.21.1:2010 Heavy Helical Spring Lock Washers
[ACS- 40] EN 1591:2024 Flanges and their joints - Design rules for gasketed circular flange connections
[ACS- 41] ISO 724:2023 ISO general-purpose metric screw threads – Basic dimensions
[ACS- 42] EN 10269:2013 Steels and nickel alloys for fasteners with specified elevated and/or low-temperature properties
[ACS- 43] EN 13555:2021 Flanges and their joints - Gasket parameters and test procedures relevant to the design rules for gasketed circular flange connections

6.2.3 Applicable Orders and Directives

The orders and directives that shall be used in this contract are listed in the table below.

[AOD- 1] PED/ESP - European Pressure Equipment Directive 2014/68/EU of 15th of May 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment
[AOD- 2] ESPN - Order dated 5th September 2025 on nuclear pressure equipment. Consolidated version after the 1st of January 2019 shall be taken into account.
[AOD- 3] INB Order - Order dated 7 February 2012 relating to the general technical regulations applicable to INB
[AOD- 4] ASN Guide #8 - Conformity Assessment of Nuclear Pressure Equipment - Version of 2012-09-04 – EN – IDM UID DU9A7L
[AOD- 5] Arrêté du 20 novembre 2017 relatif au suivi en service des equipments sous pression et des recipients a pression simple
[AOD- 6] ASN Guide #19 - Nuclear Pressure Equipment - Application of order dated 12/12/2005 - Version of 21-02-2013 – FR – IDM UID FXQ9NZ

7 General requirements

The quality classification for each item in the scope of supply is defined in [AD- 2]. For QC-1 items, the critical quality activities must be approved by IO before being undertaken. Throughout the document, special processes are identified. These special processes will require their

procedures to be submitted to IO and accepted prior to their undertaking and reports submitted in the manufacturing dossier.

7.1 Units of Measurement

The supplied equipment as well as corresponding documentation shall use SI units.

7.2 Declaration of conformity to PED – ESPN regulations

The PED and ESPN classifications for the level switches are defined in [AD- 2] based on the assumption that the technology can be installed on a DN50 flange.

If the required DN is higher, the PED ESPN category will be increased.

If the proposed technology can be fitted on a DN25, the level switches would become "component of the piping" to which the instrumentation will be installed because there is no housing having internal pressure higher than 0.5 barg. The ESPN certification would then not be required. Relevant essential safety requirements (i.e. material see section 7.8, design) of piping shall still be considered for this instrumentation. The full volumetric inspection would not be required.

Based on a DN50 flange installation, the "Level Switches" are "Pressure Accessories" and the Contractor is the regulatory manufacturer. As the regulatory manufacturer of ESPN N2 PE category I instruments [AOD- 1][AOD- 2], the Contractor can be guided by the implementation plan defined in [AD- 37]. Particular attention should be paid to the recommended list of documents defined in [AD- 36][AD- 38].

7.3 Design codes

Independently from the design code selected, the Contractor shall demonstrate the compatibility of the level switches with the stainless-steel pipework, designed according to EN 13480 [ACS-6].

The expected applicable design codes are specified in the body of this specification. The Contractor may propose alternative design codes where he believes adequate justification may be made. The alternative codes shall be accepted by IO.

The design features not specifically addressed in this specification, codes and standards specified herein shall be performed by good engineering practice.

7.4 Design calculation and Operating conditions

The Contractor shall provide engineering analysis documenting how the supplied items meet or exceed the design and operating requirements detailed in the datasheet [AD- 2]. All the equations used for the sizing of the instruments shall be explicitly described in the calculation note by the Contractor.

Each item shall be designed for safe, proper and continuous operation over the design life of ten (10) years, at their design conditions as specified in [AD- 2]. They shall also be designed to

minimize fatigue, thermal transient effects, corrosion, deterioration, vibration, and other operational problems. They shall be designed to permit satisfactory operation at the pressure conditions, accelerations, temperatures, differential pressures, system fluid and imposed loads.

7.5 Quality Assurance

The Quality class under this contract is detailed in [AD- 2] for each item in the scope of supply, it involves QC-1 & QC-2 items. GM3S section 8 [AD- 1] applies in line with the defined Quality Class.

7.6 Safety Important Component

The nuclear safety class under this contract are defined per item in [AD- 2]. The scope under this contract covers for PIC and PIA and PE/NPE components, [AD- 1] GM3S section 5.3 applies.

The design and qualification of the VVPSS instruments shall follow the requirements defined in [AD- 20] (overall and section 5.2 Applicable standards) according to their IO safety class and [AD- 19]. The equivalence of the IO safety classification and the relevant standards is defined below:

Structure System Component (ITER)	Function safety level IEC 61226 – category [ACS- 33]	System safety level IEC 61513 – class [ACS- 7]
PIC/SIC-2-C	C [ACS- 34]	3
Non-SIC	Non-Safety	Conventional I&C

7.7 Environmental Qualification

Each item shall be demonstrated to withstand all the loads applied in normal and accidental conditions (temperature, pressure, interface, seismic, fire, radiation, electromagnetic, etc.). Reports for all analyses performed for the selected instruments shall be submitted to the IO for review and approval before the start of manufacturing. The Contractor shall comply to the qualification guidelines defined by IO [AD- 21][AD- 24][AD- 25][AD- 26][AD- 27][AD- 28][AD- 29][AD- 30][AD- 31][AD- 32][AD- 33][AD- 34]

Two different plant conditions are expressed:

- Normal conditions: This corresponds to the normal operation of the plant and for which all systems are requested to operate properly. These conditions are encountered during the whole life of the plant (14 years of nuclear operation and 10 years of commissioning operation),
- Accident conditions: This corresponds to a highly degraded operation of the plant due to unlikely failures or highly hypothetical failure. Safety classified VVPSS instruments are requested to operate properly during accident conditions. The accident conditions are encountered only once during the whole life of the plant. The negative effect of ageing on component shall be taken into account; that means the safety classified equipment shall operate properly throughout the whole life of the plant.

SUPPLY

The required approach is to select passive/mechanical switches with no infield electronics. The switches will be installed in the field (the installation room is given for each item [IO-8][IO-9][IO-10] in [AD- 2]) while if any, the electronics/signal module/relay are deported to sheltered area (cubicles), refer Figure 3.

Field area

	Normal condition	Accident condition
Ambient room temperature	18 °C – 35 °C	5 °C - 130 °C [IO-2]
Ambient room humidity	20% RH – 60% RH	0% RH – 100%
Ambient room pressure	86 – 106 kPa	100 – 200 kPa [IO-2]
Static magnetic field (modulus)	< 20 mT [AD- 50][AD- 51]	
Transient magnetic field (modulus)	< 3.5 mT/s [AD- 50][AD- 51]	
Total Ionizing dose (TID, silicon based)	< 2.3E3 Gy [IO-1]	
Dose rate (Ionizing radiation dose, silicon based)	< 1.0 Gy/h [IO-1]	
Equivalent Neutron Fluence (ENF @ 1Mev, silicon based)	≤ 5.5E11 neutron.cm-2 [IO-1]	
Total Neutron Flux (TNF)	≤ 2.4E5 neutrons.cm-2.s-1 [IO-1]	
Seismic [IO-11][IO-12][IO-13][IO-14]	NO	SL-3: X-Y: 5.5 g/Z: 3.5 g SL-2: X-Y : 4.5 g/Z : 2.5 g SL-1: X-Y :1.5 g/Z : 1.0 g
Fire event maximum temperature	NO	< 7.1 m: 142 °C 7.1 to 9.6 m: 277 °C > 9.6 m: 905 °C [IO-17]

Table 1: Environmental conditions applicable in the field (process area) in 11-B2-01 & 11-B1-01 Drain Tank Room (DTR)

Sheltered area

	Normal condition	Accident condition
Cubicle temperature	10 °C – 15 °C [IO-5]	-15 °C - +60 °C [IO-2]
Ambient room humidity	20% RH – 60% RH	0% RH – 100%
Ambient room pressure	86 – 106 kPa	84 – 120 kPa [IO-2]
Static magnetic field (modulus)	< 20 mT [IO-4]	
Total Ionizing dose (TID, silicon based)	SIC: ≤ 1 Gy (2) [IO-15] Non-SIC: ≤ 10 Gy (3) [IO-15]	
Equivalent Neutron Fluence (ENF @ 1Mev, silicon based)	SIC: ≤ 1E8 neutron.cm-2 (2) [IO-15] Non-SIC: ≤ 1E10 neutron.cm-2 (3) [IO-15]	
Total Neutron Flux (TNF)	SIC: ≤ 10 neutrons.cm-2.s-1 (2) [IO-15] Non-SIC: ≤ 100 neutrons.cm-2.s-1 (3) [IO-15]	
Seismic [IO-11][IO-12][IO-13][IO-14]	NO	SL-3: N/A SL-2: X-Y: 1.5 g/Z: 4.0 g SL-1: X-Y: 0.5 g/Z: 1.5 g
Fire event maximum temperature	NO	N/A

Table 2: Environment conditions applicable in the shielded area (inside SIC and Non-SIC cubicles [IO-6][IO-7])

(1) Based on 1% of total fluence during DT-1 operation.
(2) ITER Maximum threshold for critical electronic functions
(3) ITER Maximum threshold for non-critical electronic functions

7.7.1 Seismic Qualification

All level switches shall be capable of withstanding the accelerations associated with the seismic events without loss of confinement.

As per [AD- 2], the level switches are classified SC-1 (S) SL-3: Structural performance shall be ensured in SL-1 and SL-2 events (Figure 1). In addition, they should also withstand SL-3 events to be aligned on the tanks/vessels on which they are mounted (Figure 2).

The Contractor shall perform a modal analysis of the component. If the First frequency is well above cut off frequency which is 33HZ, then the Zero period acceleration from the FRS can be applied, or else please apply 1.5 time the peak acceleration in each direction.

Qualification by analytical calculation is acceptable for mechanical integrity verification but qualification by test is expected for operability verification. The methodology for seismic qualification of instruments can be obtained from the ITER Instruction for Seismic Analysis [AD- 4].

The seismic qualification tests, applicable only to those extended structures for which the analytical qualification is deemed not sufficient, shall be performed according to the standard IEC 60068-3-3 [ACS- 5].

It is recommended for the Contractor to provide a detailed quotation and planning of the activities that consider the selected seismic qualification.

7.7.2 Electromagnetic field

As a general remark, IO recalls that the static magnetic field applied for the qualification test shall be between 1.4 and 2.0 times higher than the one experienced by the equipment during operation. IO has an in-house static magnetic field-testing facility and can perform testing on behalf of the Contractor.

Equipment shall comply with IEC 61000 [ACS- 36] series for EMC immunity and emissions, unless otherwise justified. The EMC qualification shall be compatible with the environmental conditions defined in this specification.

The proposed technology shall not be affected by the ambient magnetic field in the room [AD-50][AD- 51].

7.7.3 Irradiation and neutron flux

It should be noted that there is a very significant level of irradiation as a normal condition (and not only accidental condition) in ITER and it needs to be considered in the design of SIC as well as Non-SIC items (Table 1). Very high neutron flux is present in ITER which is known as problematic for electronic devices due to Single Effect Event as encountered in aeronic and aero-spatial industry.

The proposal of a qualified solution will be preferred. The existing qualification shall be approved by IO, follow nuclear industry standard and match the level of requirement developed in IO own neutron testing program summarized below. Alternatively, the vendor can demonstrate that the proposed solution is not impacted by neutron irradiation.

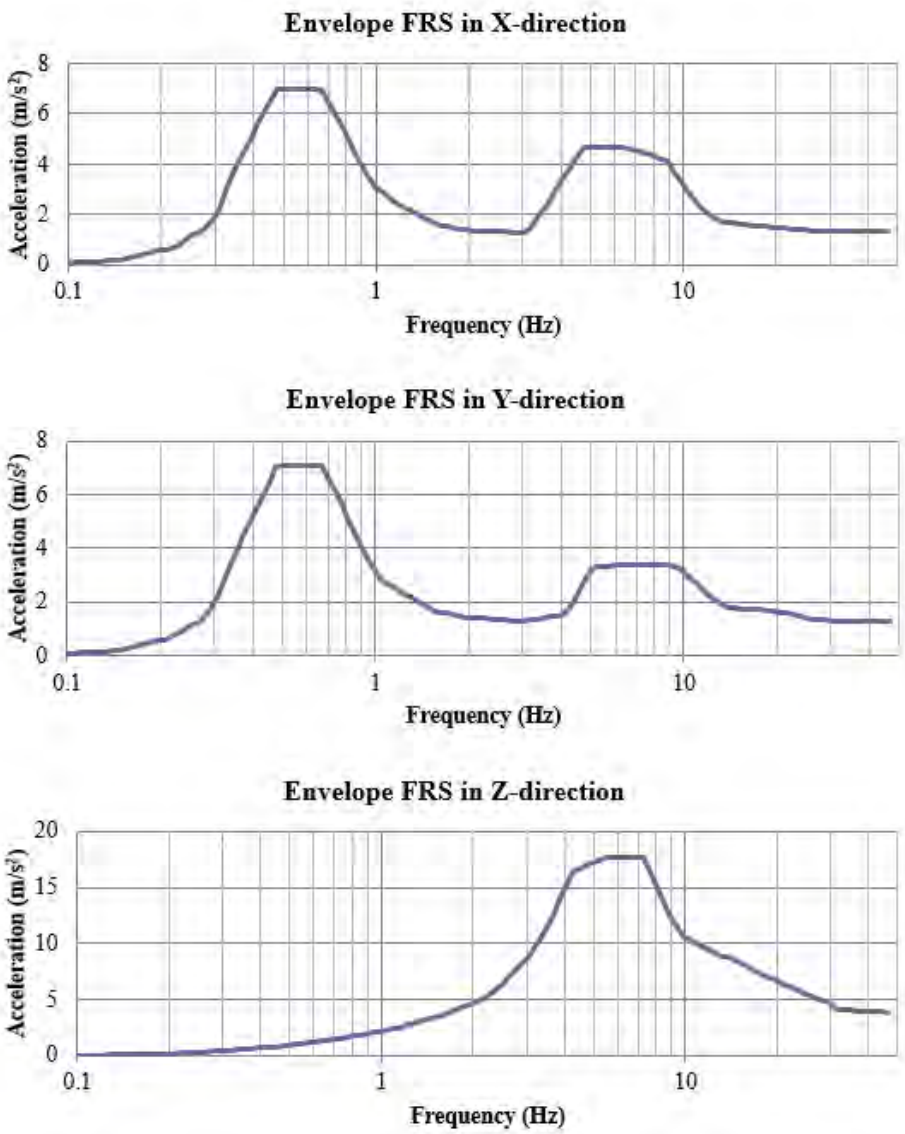


Figure 1: SL2 Seismic load on VVPSS level switches (DTR B2 envelope) [IO-12][IO-14]

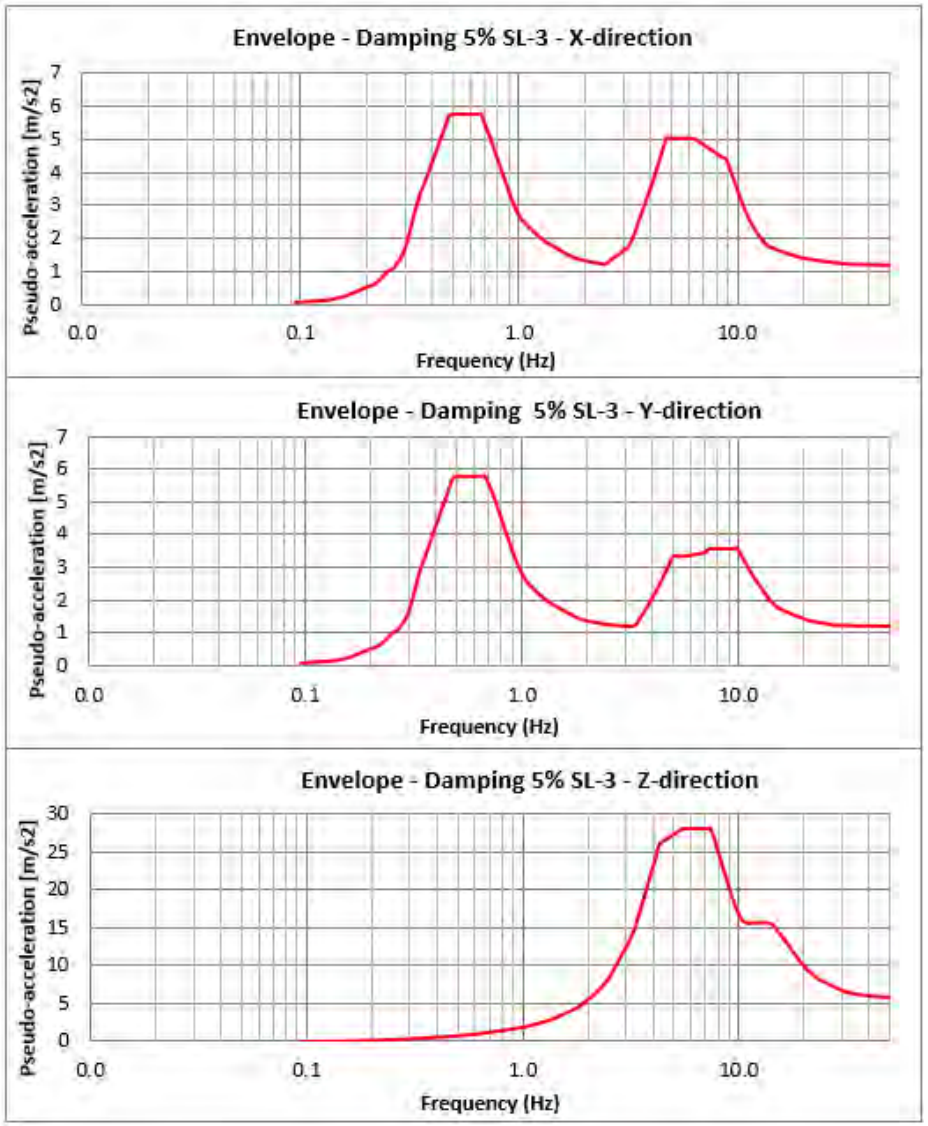


Figure 2: SL3 Seismic load on VVPSS level switches (DTR+NB RL envelope)[IO-13]

The selected neutron source shall achieve the neutron fluence in a time period of 190 to 200 days that is to achieve a neutron flux as close to the one listed in Table 3 and have the irradiation on going round the clock for the said duration.

If 200 days of continuous irradiation is not feasible, the contractor may use a flux up to ten times the rated value, reducing exposure time to 20 days. The chosen flux and duration must be confirmed with IO, and documented in the contractor's irradiation procedure for the campaign.

Energy Bin	Energy level	Neutron flux (N/cm²/sec)	Neutron Fluence (n.cm⁻²)
Bin-000	<1E-6 MeV	34545.33	5.85E+11
Bin-001	1E-6 to 0.1 MeV	38696.25	6.55E+11
Bin-002	0.1 to 1 MeV	4771.85	8.07E+10
Bin-003	1 to 10 MeV	552.54	9.35E+09
Bin-004	> 10 MeV	19.01	3.22E+08
Total		78186.14	1.32E+12

Table 3: IO required neutron flux

Participation to the IO neutron qualification program is subject to discussion.

7.7.4 Environment ambient conditions

Environmental qualification of the instruments shall be performed at the bounding environmental conditions defined in Table 1 or Table 2, depending on their location, to evaluate the function of the instrument components whose failure could prevent the instruments from performing the intended function. The qualification thresholds shall account for the values given in ITER Policy on EEE in Tokamak Complex [AD- 22].

For the adequate qualification of the instruments to operate in the accident conditions (defined in Table 1 or Table 2), the pressure and temperature profiles versus time used in the qualification test campaign shall be approved by IO.

The requirements for resistance to accident ambient conditions are as follow:

- SIC items: Structural integrity and functional performance shall be ensured,
- Non-SIC items: Structural integrity shall be ensured.

Maximum conditions during which instruments can maintain process confinement integrity shall be provided. Instrument should be able to maintain process confinement under external temperature/Pressure within the range defined in Table 1 / Table 2.

Maximum environmental conditions during which instruments can operate to specifications during at least two hours shall be provided, including at minimum 3:

- Temperature range: - xxx °C < T < xxx °C
- Humidity range: xxx < RH < xxx%
- External pressure (relative to atm): - xxx kPa < P < +xxx kPa

IO will manage any additional containment/protection necessary to respect accidental conditions at each instrument location (Fire event, Water LOCA, etc…). Protective enclosure is out of scope.

7.7.5 Fire

The contractor shall specify the maximal operating temperature without degradation of performance, as well as the maximal temperature to which the switches can be subjected during fire accident.

The requirements for resistance to fire are listed in the table below (S: Structural integrity shall be ensured & SF: Structural integrity and functional performance shall be ensured & N/A: no requirement):

Scope	24VP00	24VPHM
SIC item	SF	N/A
Non-SIC item	N/A	N/A

Integrity is demonstrated as no loss of confinement after two hours. Integrity and functional performance are defined as no loss of confinement and switch functionality after two hours.

The maximum temperature achieved during a fire event is given in Table 1. The elevation of components to assess the maximum temperature in the DTR (Table 1) are given in [AD- 2].

The Contractor shall either design the switch for the maximum fire temperature achieved or specify the required thickness of the fire protection to be installed to protect the structural integrity and/or functionality of the switch. If a specific fire protection equipment, such as an enclosure for the switch, is deemed required and the Contractor has the capacity to include it in its scope of supply, it should be included in the quote as an option.

Any supplied equipment shall be specified to minimize the fire-load.

7.7.6 Ageing

The accidental tests shall be performed on the same specimens used for ageing tests. The accidental conditions need to be simulated at the end of the qualified life.

If the effects of ageing are demonstrated to be negligible, the ageing test could be avoided.

In this case, the contractor shall demonstrate that ageing effects are negligeable for the expected qualified life for all the parts sensitive to aging (for radiation, thermal, humidity or mechanical effects) that could affect the safety function. It shall identify at minimum the non-metallic parts (e.g. polymeric materials), electronics parts (parts containing contain silicon, transistors, semiconductors and integrated circuits), and the I&C programmable components.

7.8 Material requirements

The material selected for the VVPSS instruments is Austenitic Stainless Steel. Any deviation from this material shall be agreed with IO and, in any case, compatible with the VVPSS piping assembly, which is EN 1.4307, grade 304L. The stainless-steel material shall be suggested by the Contractor and submitted to IO for review and approval. If available, and if cold working is anticipated during manufacturing, the preferred grade is 316L.

To ensure the VVPSS meets the radioprotection guidelines as stipulated in the Radioprotection Guide for ESPN Application [AD- 5], strict requirements are placed on the chemical composition of Cobalt, Niobium, and Tantalum in the materials for the instruments. As a general remark, it is important to highlight the fact that the requirements for the chemical composition of Cobalt, Niobium, and Tantalum apply to all components and not only to the “wet parts”. Table 4 sets additional requirements for the impurities’ maximum concentration.

Location	Composition, % (Maximum, unless otherwise indicated)		
	Cobalt	Niobium	Tantalum
11-B1-01 11-B2-01	<0.2	<0.1	<0.1

Table 4: Maximum Impurities Content for VVPSS instruments [AD- 5]

NOTE, IO may consider deviation from this requirement where the Contractor can demonstrate the component to have a small mass (i.e. bolts, nuts, washers, etc.) and the cost of achieving the above low activation requirements would be excessive compared to the decrease in overall cobalt, niobium or tantalum. No deviation is allowed on large items.

Fire resistance material with no or low flammability shall be selected to the extent practical.

7.8.1 Prohibited materials

The Contractor shall be aware of the following requirements, related to the prohibited materials:

- Mercury shall not be used in any manner, including the construction of the instruments, which can result in the exposure of instrument parts to the metal or its vapour.
- The use of lead or other low melting point metals in contact with the working fluid is prohibited.
- The use of nitrided surfaces exposed to the working fluid is prohibited.
- Care shall be taken to prevent contamination of instrument material by red lead-graphite mineral oil, molybdenum disulphide lubricants, halides, sulphur, copper, zinc and phosphorus.
- Teflon and similar elastomers may not be used.
- The use of Halogen products is prohibited. This requirement applies to all components, including gaskets and other non-metallic materials. Any deviation from non-zero halogen content in any of the materials used for the instrument shall be reported to IO and its use shall be subjected to IO approval.
- The use of materials containing asbestos shall be prohibited.

7.8.2 Material testing requirements

The Contractor needs to establish the PMA/NPMA for the equipment whose PED category is equal to or higher than I. The requirement for material testing shall be in line with the PMA/NPMA. [AOD- 1][AOD- 2]

The Contractor needs to provide the inspection documents (type 3.1 or 3.2) for the Level Switches in final product condition.

Inspection document showing that required tests have been carried out at the source should be submitted. Type 3.1 certificate of EN 10204 [ACS- 2] shall be provided for main pressure retaining materials. The chemical Co, Nb and Ta concentration evaluation shall be included as a result in the Type 3.1 certificate. If the material Manufacturer is not able to issue the type 3.1, type 3.2 shall be provided. Type 2.2 needs to be provided for gasket and filler metal.

A second material testing certificate, submitted by an independent certified laboratory, shall be included in the list of documentation submitted to the Contractor, after the placement of the supply order.

Materials shall be clearly marked so that they are always readily identifiable with their test certificates and reports. Marking shall be transferred to all pieces when a part is cut to make more than one component. Material without identification shall not be used in the manufacture of the instruments. The method of marking and marking procedures are subject to IO acceptance.

Stainless steel sensitisation shall be tested according to ASTM A262-15 [ACS- 23] Practice A+E.

7.8.3 Impact and Tensile test

Mechanical properties shall be obtained from test specimens representing the final heat-treated condition of the material required by the specification. As specified in [AD- 2], the tensile and impact tests do not need to be carried out at operating temperature.

All tests shall be carried out by an ISO 17025 [ACS- 3] accredited laboratory.

7.8.4 Traceability

The Contractor shall have traceability procedures in place that will guarantee traceability between materials delivered and from the beginning of manufacturing. These procedures shall be submitted to and approved by the IO prior to the start of any manufacturing. Traceability shall be maintained by procedural methods that cover receipt, identification, storage, and transfer to production, temporary storage and for use in production.

7.8.5 Counterfeit Materials

The Contractor shall include a section in the Quality Plan that defines the measures put in place to avoid the procurement of counterfeit materials.

The full supply chain for all materials that become part of the Level Switches (pressure boundary) shall be provided in a document to be presented at the Manufacturing Readiness Review.

In addition to material testing required above, confirmatory material composition and tensile strength testing shall be undertaken on samples taken directly from each batch of the Level Switches raw materials following their delivery to the Contractor’s works.

7.8.6 Technical Qualifications

When a technical qualification is required, the Contractor must demonstrate that the manufacturing operations selected for the component subject to this technical qualification will ensure that the risks of heterogeneity among its mechanical and chemical characteristics are controlled.

7.9 Flanged connections

For preparing flanged ends with flange facing, nut-bearing surfaces, outside diameter, thickness, and drilling, IO recommends using EN 1092-1 [ACS- 37]. The Contractor is responsible for providing the pressure class of the selected flanges, based on the PS/TS.

Flanged ends shall be prepared with flange facing, nut-bearing surfaces, outside diameter, thickness, and drilling by EN 1092-1[ACS- 37].

The level switches shall be provided with adequate bolts, nuts, washers, and gaskets as described below:

- Bolts: Bolting for the flanged connections shall be supplied with each flanged level-switch and should conform to EN 1515 [ACS- 38]. The material selection shall be based on the assembly requirements to achieve leak tightness. The Contractor shall calculate the bolt torques to provide proper assembly.
- Nuts: Nuts for the flanged connections shall be supplied with each flanged level switch and should conform to EN 1515 [ACS- 38]. The material selection shall be based on the assembly requirements to achieve leak tightness.
- Washers: Washers (lock or Belleville) shall be supplied with each flanged level switch, as described in ASME B18.21.1 [ACS- 39].
- Gaskets: Gaskets shall be supplied with each flanged level switch. The gaskets should conform to EN 1591 [ACS- 40] to ensure compliance with leak tightness requirements.

The items provided shall be adequate for the level switch‘s class with which they are supplied.

Threaded fasteners shall have M series threads conforming to ISO 724 [ACS- 41]. All threaded pressure-retaining fasteners shall be provided with corrosion-resistant locking devices.

All nuts and bolts shall have hexagonal heads unless otherwise specified.

The minimum strength of the material used for the nuts and bolts shall meet the requirements of EN 10269 [ACS- 42].

The Contractor is requested to verify that external leak rate complies with the leak rate of L0.001 according EN 1591 [ACS- 40] and EN 13555 [ACS- 43], taking into account the interface loads from the associated piping generated during all plant conditions.

7.10 Welded joints

Welding activities are considered “Special Processes”.

Each welding procedure that is to be followed in fabrication shall be included or cross-referenced in the Manufacturing and Inspection Plan (MIP) and weld map. Additionally, the procedures shall be included in the Weld Data Package.

All pressure bearing joint welds shall be full penetration. No threaded joints or socket welds shall be used.

During manufacturing, particular attention shall be given to cleanliness, especially the removal of weld spatter, debris and other foreign matter. All surface treatment, cleaning, mounting, and vacuum acceptance testing of the Level Switches shall be considered and accounted for in the design.

All repairs, re-work, or scrapping shall be documented and records maintained for each specific item. The base metal repair welding shall be treated through IO NCR database. The location and size of the repairs shall be recorded in the as-built drawing. The records shall relate repairs with the procedure used. A maximum of one weld repair cycle shall be permitted on austenitic stainless steel. The IO shall be notified in the event the weld repair is unsuccessful. The repairing procedure shall follow prescriptions stated in EN 13480 [ACS- 6].

Production welding operations may only be undertaken provided the following requirements are met:

- Personnel satisfy the requirements of EN 13480 and EN 3834-2 [ACS- 9],
- The filler materials shall have Inspection Certificate type 2.2 as per EN 10204 [ACS- 2],
- Welding procedures have been qualified in accordance with EN 15614 [ACS- 10],

- The edges to be welded shall be prepared in accordance with EN 13480 [ACS- 6],
- All the welds shall be identified with a unique number and shall be traceable back to the welder/operator and WPS used,
- Any visible defect liable to affect the correct execution of the next pass shall be removed,
- Cracks or cavities visible on the surface shall be removed by chipping and by grinding and/or milling.

7.10.1 Preparation for Welding

Preparation of welding should comply with EN 13480 [ACS- 6] and ISO 9692 [ACS- 11].

Weld over thicknesses shall not exceed the tolerances given in EN 13480 [ACS- 6]. If they exceed grinding or machining should be applied.

The edges to be welded shall be kept in the position, either by mechanical means temporary attachments, by tack welding or by a combination. Inspections before and after alignment shall be carried out.

The cleaning of internal and external surfaces should conform to EN 2516 [ACS- 12].

7.10.2 Surface Preparation Requirements

Selection, qualification, and application of coating materials should follow applicable sections of the Steel Structures Painting Council (SSPC) specifications. Surface preparation activities should be by the following standards or recommended practices as applicable: SSPC-SP-1 [ACS-13], SSPC-SP-2 [ACS- 14], SSPC-SP-5 [ACS- 15], and SSPC-SP-10 [ACS- 16].

Surface roughness (Ra) shall not exceed 3.2 μm.

Weld joint preparation shall not be performed by thermal processes.

All coating systems must be applied following the Contractor’s recommendations. The blast cleaned surfaces shall be coated with the base coat within 4 hours after blasting and before rusting occurs. All surface preparation and painting work shall be done after the visual examination, as part of the final assessment, and be subjected to the approval of IO. Colour selection shall be subject to IO's approval before the topcoat application.

7.11 Manufacturing Readiness Review

A Manufacturing Readiness Review (MRR) shall be conducted in line with [AD- 8] and closed (by the IO) enabling the start of manufacturing activities. This MRR shall be included on the MIP as a Hold Point. The MRR is a joint ITER-Contractor meeting to give approval for the Contractor to start manufacturing. For the final approval, the following documentation shall be presented:

- Procedures for special processes,
- All manufacturing drawings,
- Material test certificates (Inspection document),
- Engineering (Structural) analysis,
- Personnel qualification.

In addition, when relevant according to the PE/NPE classification defined in [AD- 2], the Contractor shall provide the documents listed in Appendix I of [AD- 36] that are available at the stage of the MRR.

7.12 Manufacturing, Inspection and Testing

Before the Manufacturing operations, a Manufacturing and Inspection Plan shall be prepared by the Contractor as detailed in GM3S section 8.4 [AD- 1]. Inspection, examinations and tests shall be conducted to provide compliance with applicable code and standards.

Non-destructive examinations (NDE) shall be performed on the cast, forged, rolled, wrought, or fabricated material after heat treatment required by the material specification. Surfaces shall be clean and free of surface conditions that may mask unacceptable indications.

NDE Personnel shall be qualified in accordance with ISO 9712 [ACS- 4].

The IO reserves the right to inspect all Non-Destructive Examination (NDE) reports for auditing purposes. NDE reports shall be catalogued according to the weld maps. Additional documents outside this specification's scope will provide detailed instructions for the commissioning of the components.

7.12.1 Visual Examination

Visual examination is considered a "Special Process".

Visual and dimensional control shall be conducted according to EN 17637 [ACS- 17] before the execution of non-destructive examination after possible heat treatment and before any machining or grinding operations of weld surfaces. During welding, each pass shall be visually examined, after the complete removal of the slag, if necessary.

A complete visual inspection of the pressure boundary parts on all Level Switches is required. The purpose of the visual inspection is to verify all surfaces are free of cracks, hot tears, arc strikes, marks and/or other detrimental discontinuities. All finished welds shall be subject to visual examination.

7.12.2 Volumetric Examination

The Contractor may choose Radiography or Ultrasonic inspection as appropriate.

Full volumetric inspection shall be performed also on end-connections.

7.12.2.1 Radiography inspection

Radiography examination is considered a "Special Process"

IO recommends the use of EN 17636 [ACS- 18] and ISO 10675-1 [ACS- 19] for the radiographic procedures and acceptance criteria.

7.12.2.2 Ultrasonic inspection

Ultrasonic examination is considered a "Special Process".

IO recommends the use of EN 11666 [ACS- 20] and EN 17640 [ACS- 21] for the ultrasonic examination of casting products.

7.12.3 Surface Examination

Surface examination is considered a "Special Process".

When an item is classified non-ESPN and 100% volumetric inspection is not required, all exterior and all accessible interior surfaces shall be given a surface examination.

7.12.4 Wall thickness measurements

Dimensional inspection is considered a “Special Process”.

The wall thickness of the pressure boundary shall be measured. The minimum thickness shall be nominal - allowable tolerance. The Contractor shall take several measurements and record the location of the measurements on the drawings.

7.13 Factory Acceptance Testing

All components shall be tested to confirm their performances in line with the Manufacturing and inspection plan. The following test are anticipated, to be confirmed by the Contractor and agreed with IO:

- Proof test
- Leak test
- Visual inspection
- Calibration test: The Contractor shall ensure the performance of sufficient calibration of the delivered equipment to ensure that the specified measurement uncertainties are met.

All documentation shall be provided to IO for approval prior to shipment.

7.14 Final Assessment Procedure

As part of the PED/ESPN conformity assessment, the following sequence of tests shall be performed:

- Document check,
- Visual examination before the pressure test,
- Pressure test,
- Final visual examination after the pressure test.

7.14.1 Document Check

As defined in Section 7.2, the Contractor shall be responsible for the PED/ESPN conformity assessment procedure. The full list of documents to be produced during the different design, manufacturing and testing phases is provided in [AOD- 4].

As-built drawing shall be prepared before final visual inspection.

7.14.2 Pressure Test

Pressure testing is considered a “Special Process”.

The level switches shall be pressure tested in agreement with their specifications [AD- 2]. These tests shall be conducted after all manufacturing activities. The Contractor shall prepare and submit the pressure test procedures for the IO review and approval. The minimum test pressure shall conform to the PED [AOD- 1].

After this pressure test, if any operation might jeopardize the compliance of this equipment with ESR, new pressure test shall be performed again.

7.14.3 Visual Examination

Visual examination shall be performed according to Section 7.12.1.

Final visual inspection shall be done two times, before pressure test and after pressure test.

Final visual inspection before pressure test shall be done on all internal and external surfaces based on the as-built drawing. If some areas cannot be inspected during final visual inspection before pressure test (i.e., shell surface covered with support or pad), those area shall be identified at the design phase and final visual inspection during manufacturing at the last step shall be performed and recorded.

7.15 In-Service Inspection and Maintenance

The scope of this specification shall include technical field support and consultation services during the installation, initial operation of all equipment furnished, performance testing and training of IO operating and maintenance personnel.

Level Switches shall be designed to permit inspection, satisfying the provisions given by Instruction manual which shall be prepared by Contractor, in ESPN [AOD- 2] and in [AOD- 5].

The minimum periodicity for preventative maintenance or in-service inspection shall be 18 months.

The Contractor shall include in the operation and maintenance manual instructions on how the internal and external inspections can be undertaken. Any tools required to perform the above inspections shall be included in the scope of supply of this contract (excluding cameras or endoscopes).

The parts requiring adjustment, inspection, or repair shall be accessible and capable of convenient removal, cleaning, replacement, and repair.

A list of these spare parts and recommendation for their shelf life shall be well indicated in the Instruction Manual. The scheduling of the verification and replacement of these subcomponents shall also be included in the Instruction Manual.

The Contractor shall provide the requirements for periodic calibration and preventive maintenance.

7.16 Cleanliness and Packaging

7.16.1 Cleanliness Requirements

The “wet” surfaces of the Level Switches shall meet the requirements for ASME NQA1 [ACS-1] Table 302.5 Class A cleanness.

The other surfaces of the Level Switches shall meet the requirements for ASME NQA-1 [ACS-1] Table 302.5 Class A cleanness before packaging.

During cleaning, particular attention shall be given to the removal of weld spatter, debris and other foreign matter, particularly from the coolant passages and sealing surfaces. Final cleaning shall ensure effective cleaning without damage to the surface finish, material properties or

metallurgical structure of the materials. The Contractor shall submit to the IO the proposed cleaning procedure for approval/acceptance.

Any expendable materials that come in contact with the Level Switches shall minimize the impact on operating chemistry and shall not cause degradation (e.g., by cross-contamination with carbon steel). Use of expendable material shall be controlled by written procedure. The Contractor shall ensure that all stainless-steel material covered by this specification does not come into contact with any other metals (especially carbon steel), at any stage of the whole manufacturing process (in particular during raw material storage, manufacturing itself, final product storage) and shipping as well, by ensuring a proper segregation from non stainless-steel material. The purpose is to avoid cross contamination of stainless steel by other metallic products. The Contractor shall demonstrate how they achieve segregation of stainless steel and carbon steel materials in their tender offer. In case of proven contamination of stainless steel by carbon steel, contractor shall perform pickling and passivation of the contaminated material. Pickling and Passivation shall be considered as a “special process”.

Before the start of fabrication, when such materials are used, a listing of proposed materials and products to be used on the Level Switches for the expendable products covered by this specification, along with a Certified Product Report for each product, shall be submitted to the IO for approval. This list shall include grinding wheels, adhesives, dye penetrant materials, rust preventatives, tapes, temperature indicating sticks, paint sticks or inks, ultrasonic testing couplants, weld purge dams, welding/cutting compounds, wrapping materials including temporary insulating materials, desiccants, plugs, caps, layout dyes, machining coolants and lubricants, cleaning agents, and solvents.

All water used for cleaning and hydrotesting shall meet the requirements of ASME NQA-1, Part II, Subpart 2.1, Section 304.1, Water [ACS- 1] for hydrotesting and Grade A water quality according to RCC-M 2012, Annex F-III for cleaning.

7.16.2 Marking and Labelling

The Contractor shall employ a material marking system that ensures the control of the material used in the manufacture of the Level Switches.

For stainless steel materials, electrochemical etching may be used. Etching must be performed to a written procedure and the fluids used must be certified to contain less than 100 ppm of total halogens, lead and sulphur. The process must result in marking with demonstrated legibility and durability.

All components and the main subcomponents shall be clearly marked permanently and in a visible place with the IO official numbering system according to the document “Specification for Labelling of Equipment on ITER Project” [AD- 14].

Final nameplate information shall be approved by IO.

7.16.3 Packaging Requirements

All components requiring re-assembly at the ITER Site shall be clearly labelled and tagged.

All Level Switches shall be prepared for shipment so that handling and unloading may be facilitated. At no time are Level Switches or accessories to be shipped in a disorderly arrangement or situation of disarray to promote damage or hamper inspection of the Level Switches when received on the job site.

The Contractor shall design and supply appropriate packaging, adequate to prevent damage during shipping lifting and handling operations. Where appropriate, accelerometers or other

sensors shall be fitted to ensure that limits have not been exceeded. When accelerometers are used, they shall be fixed onto each box and shall be capable of recording the acceleration along three perpendicular directions.

Shock-absorbing material shall be used.

Each shipment shall be accompanied by a Delivery Report shall be prepared by the Contractor, stating as a minimum:

- The packing date,
- The full address of the place of delivery and the name of the person responsible for receiving the package, as well as the Contractor's name and full address,
- Bill of Materials,
- Security Measures,
- Release Note,
- Packing List,
- Material Safety Sheet,
- The declaration of integrity of the package,
- The declaration of integrity of the components,
- Any additional relevant information on the status of the components.

The packaging for Level Switches shall meet the minimum requirements of ASME NQA-1, Para. 302.3 Level B [ACS- 1], for overseas shipment, and the additional requirements stated herein.

Packaging of the Level Switches shall be provided to ensure adequate protection, yet still allow adequate thermal breathing, during transport and delivery, on-site storage before installation, and during the idle period after the Level Switches are installed and awaiting operations.

Packaging and shipping details, including drawings, shall be prepared by the Contractor and submitted for review and acceptance before shipment.

Materials intended for use in preservation, packaging, and shipping, such as tape, wood, plastic caps, sheets, vapour corrosion inhibitor coverings or other covers which are applied directly to stainless steel and nickel-based alloys shall be compatible with the materials to which they are applied.

All switches and material shall be protected for ocean shipment, inland transport, and storage at the site, according to applicable International Standards. Individual items shall be packed with adequate sealing to prevent ingress of moisture and with adequate cushioning material to prevent damage during shipment. All openings shall be covered by suitable plastic caps/plugs. Similarly, end connections (Threads) shall be suitably protected.

8 Scope of Supply

This section defines the specific scope of work, in addition to the contract execution requirement as defined in [AD- 1]. The Contractor shall submit a proposal to provide items requested in this specification meeting all applicable requirements.

8.1 Scope

The list of level switches included in the scope of supply is detailed in [AD- 2]. The Contractor shall supply as a minimum:

- Level switches, flange-mounted OR DP switch with NC contact for each switching point,

- Stilling tube if required,
- Short lead cable and its connectors from the switch to the junction box (20 meters),
- Signal module/remote electronics/relay if any are required (DIN-rail mountable, Normally Closed type),
- Comprehensive list of manufacturers recommended Spare Parts.

The insulation is not in the scope of supply.
The cable selection and design are in the scope of the Contractor and shall comply with IO requirements. It is appreciated that the cable reference is part of the IO Cable Catalogue [AD-18]. The cables from the field junction box to the remote cubicle are in IO's supply scope.

8.2 Design requirements

8.2.1 Level Switches - general

Suppliers can propose switches based on any technologies based on a mechanical/passive switch with no infield electronics.

The number of desired switch points per instrument is detailed per item in [AD- 2]. For flange mounting, IO requires technologies that can accommodate at least 2 switch points per instrument. If the technology proposed cannot accommodate 3 switch points when required, the Contractor shall supply additional switches to cover all the required switch points.

No local dedicated power supply shall be required for the switches.

The field instruments shall be certified at least to the degree of protection IP65 (refer to [AD- 2]) and the components installed inside the signal conditioning cubicles shall be certified to the degree of protection IP20 or better according to IEC 60529 [ACS- 24].

8.2.2 Level Switches – performance

The Contractor shall advise the performance at the quote. The values below are desired targets.

A target uncertainty of ±1% of the switch range is requested taking into account uncertainty generated by the switch and by the transmitter. The Contractor shall advise the attainable uncertainty with the proposed solution.

A time response T90 ≤ 40 s is requested for the measurement loop including switch and signal transmitter.

8.2.3 Cables

All cables shall be NF C32-070 [ACS- 25] C1 or the equivalent IEC ones:

- Reduced flame propagation (IEC 60332 [ACS- 26]),
- Flame retardant (IEC 60332 [ACS- 26]),
- Low smoke (IEC 61034 [ACS- 27])
- Halogen-free (IEC 60754 [ACS- 28])
- Nontoxicity (IEC 60754 [ACS- 28])

In addition, all SIC cables shall be fire resistant (IEC 60331 [ACS- 29] or NF C32-070 [ACS-25] CR1).

All cables in High Radiation areas (more than 10 kGy) shall be qualified according with IEEE 383 [ACS- 30] or IEC 60544 [ACS- 31] for the dose values indicated in this document.

8.3 Layout and installation

The flange mounting installation is detailed in Figure 3. The nozzle sizes and orientations are detailed per item in [AD- 2]. Some tanks have no nozzles larger than DN50 available and no spare side nozzles, therefore IO proposes to standardize the solution to a DN50 top flange mounting to limit the cost of qualification to a single schematic. Due to the congestion in the installation room, IO cannot accept a solution with side mounting external guide tube. Refer to [APPENDIX1] for more details.

If a pressure differential technology is proposed, the typical configuration is displayed in Figure 4, the gas and the liquid taping points will be on a gas and a liquid pipe, outside the tank skirt. The Contractor shall suggest the most suited arrangement to our conditions (wet leg/dry leg).

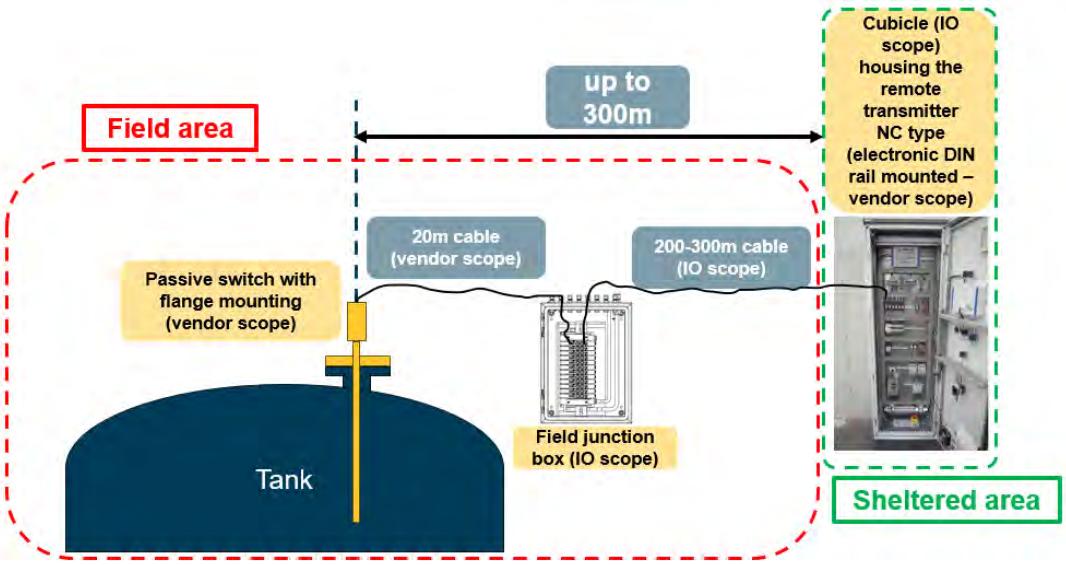


Figure 3: Installation requirement - flange mounting, passive switch with remote electronics

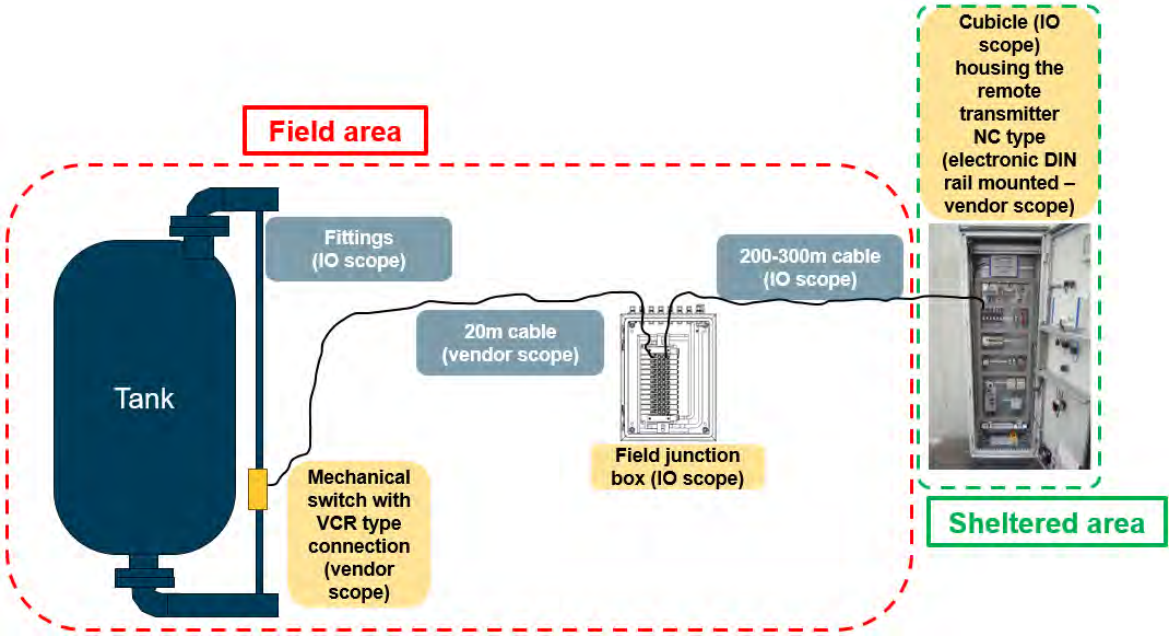


Figure 4: Installation typical - mechanical DP switch

8.3.1 Tank layout

The detailed geometrical data and configuration of each tank and vessel is given in Table 5. Each tank on which the level switches are installed and the nozzle number are given per item in [AD-2].

Tank	Status	Drawing reference	Available free height above tank head (m) (preliminary – refer [APPENDIX1])
SLT	Built & installed	[AD- 42] [AD- 48]	0.90
LLT1	Built & installed	[AD- 43] [AD- 48]	0.90
LLT2	Built & installed	[AD- 44] [AD- 49]	0.90
LLT3	Built & installed	[AD- 45] [AD- 49]	0.90
PST	Built & installed	[AD- 39]	0.40
OFT	Built & installed	[AD- 41]	2.30
QEN	Built & installed	[AD- 40]	1.90
Cooler condenser	Basic design ongoing	[AD- 46]	1.30

Table 5: Tank and vessel configuration

8.3.2 Switches to process

The tanks will be fitted with a DN50 flange adaptor to welcome the level switch mounting. The ESPN requirements will not be applicable if either of the conditions is met in the proposed solution:

- It can accommodate a DN25 or lower diameter flange-mounting/process connection,
- It does not include a pressure bearing housing.

The proposed schematic will be reviewed by IO to assess the ESPN/PED classification.

To fit the instrument head on the blind flange, IO can accept:

- Swagelok VCR fitting (or equivalent if suggested by switch supplier) in order to guarantee high tightness at the connection.
- Full-penetration weld mount (direct weld-in or weldolet). There should be only full penetration welds on pressure bearing parts.

For a DP type solution, the impulse lines will be tubing with VCR type connection or equivalent (vacuum/tritiated line standard in IO).

8.3.3 Remote electronics if any, Cables & signal conditioners

Due to the service conditions in the process area, only passive/mechanical switches with no infield electronics shall be used (Figure 3).

The cubicles assigned to house the signal transmitter might be located several levels above/below the physical location of the sensor, in a sheltered area with less stringent environment conditions. The current specification is to consider a maximal cable length of 300 m (distance from sensor to signal transmitter).

The cables are expected to be twisted pair shielded cables, and the use of the junction box between the sensor/switch and the signal transmitter is forecast to limit the footprint. There is no imposition from ITER for the connection of the switch to the electrical cable. Already qualified electrical connectors could be used but the Contractor is free to select the most suitable option as long as it allows to remove the sensor/switch from the field to perform maintenance outside without cutting the cables. A total number of 50 occurrences is assumed for the whole lifetime of the plant.

The Contractor shall provide a specification for signal connection from the switch to the transmitter, including definition of electrical connection type, definition of junction box type, etc. If the Contractor proposes to use junction boxes for signal connection, the cable length of 20 m between the sensor/switch and the junction box shall be assumed.

Cable types shall be selected from the IO Cable Catalogue [AD- 18] unless a need for specific cable type is identified and justified by the Contractor.

Any components that will be foreseen for installation inside junction boxes or I&C cubicles shall be DIN-rail mountable. SIC signal conditioner shall be DIN rail mounted inside the PLC cabinet if possible.

9 Documentation

All documentation shall conform to the following requirements:

9.1 General Requirements

All documents shall be submitted to the ITER Document Management System (IDM). A dedicated project area will be created for the purpose.

The documents produced by the Contractor may be bi-lingual. The primary language is English and the secondary language is that of the Contractor. The English text shall have the same technical meaning as the Contractor text. When bi-lingual text is used, it shall apply to all texts on the drawing.

All documents shall be clean and legible white prints with uniform background density suitable for electronic scanning and subsequent reproduction from an electronic format. In addition, all documents shall be submitted in PDF files and native format, or another electronic format if mutually agreed upon. Hard copies may be submitted in addition to electronic transmission.

Documents not meeting the quality requirements specified herein will be returned to the Contractor without IO review for correction and resubmission. Rejected documents will not be a basis for approving schedule extensions or cost increases.

All documents shall utilize IO's Flow Sensors/Flow Switches Item Number and Contractor's part number for those items and component identification.

All or part of the Contractor's documents, sketches, or instructions (or the Contractor's subcontractor's) may be copied or reproduced as necessary by IO for project use. This shall include documents that are labelled "Copyright".

The Contractor is responsible for the document requirements. This includes documents from subcontractors. This responsibility may not be delegated or passed on to any other subcontractor.

Contractor's as-built record drawings shall be updated to reflect changes made during shop fabrication. All as-built drawings (both physical copies and in native format) shall be provided prior to shipment of the equipment.

The Contractor shall provide all the documentation required to clean, start up, test, operate, and maintain all Contractor-supplied Flow Sensors/Flow Switches and accessories.

Acceptance by IO of any of Contractor's documents neither certifies nor warrants Contractor's conformance to any of its obligations under the Purchase Order.

Shall the Contractor, upon receipt of documents as commented by the IO, for whatever reason, not incorporate every of IO's comments as so marked by IO on the Contractor's documents, the Contractor shall so advise the IO in writing the reason for not incorporating these comments.

Note: Release for material procurement and fabrication shall be in writing and not dependent on document status.

The Contractor shall review and approve under its QA program drawings and/or documents submitted by the Contractor's subcontractors before submitting these documents to the IO for review. Specific cases in which parallel review by the IO and Contractor would be advantageous to the project schedule will be considered on a case basis.

Before the Release for Manufacture, the documentation shall be submitted to the IO for review and acceptance. No material orders or fabrication shall begin until released by the IO.

9.2 Weld Documentation Requirements

The following welding documentation shall be retained in the Contractor's shop and available for IO review:

- Administrative procedures for the control of the welding program, which includes qualification of Welding Procedure Specifications, qualification and assignment of welders, filler metal control, the performance of post-weld heat treatment (PWHT), control of welding work, specification of workmanship requirements, and other information related to the administrative control of welding.
- Records of Welder Performance Qualification and updates/renewal of qualification for the welders who will be assigned to the work, according to EN 9606 [ACS- 22]. Additional requirements of EN 13480 [ACS- 6] section 9 shall be applied as well.
- Drawing(s) depicting examination surface configuration and the surface finish for pressure retaining and integrally attached welds and adjacent base material subject to the volumetric examination shall be provided by the Contractor.

10 Location for Scope of Work Execution

The Contractor will perform the work at their own location. No work is anticipated at the ITER site in the framework of this contract.

11 IO Documents & IO Free issue items

N/A

12 Project Management

The Contractor shall designate a Contract Responsible Officer, within 5 working days after the award of the contract (AOC), who will be responsible for the overall design, manufacture, factory testing, installation, performance testing, schedule, cost control and resolution of disputes and discrepancies. The Contractor shall also identify specific individuals responsible for each aspect of the Work. The Contractor's proposal shall provide an outline of the management structure and resumes of the team members for the project.

12.1 Project Schedule

The Contractor shall prepare their document schedule using the template available in the GM3S Appendix II (click here to download) [AD- 1].

The Contractor shall provide a schedule within 10 working days after receipt of each Supply Order. It shall identify the submittals to and approvals from IO of the Contractor's and Subcontractors' specifications, drawings, procedures, and other types of documents as appropriate.

As a minimum the schedule shall include task descriptions with start and finish dates for each task. Separate detailed task breakdowns shall be provided for design, procurement, fabrication, and factory testing phases and end with a Scheduled Jobsite Delivery Date.

The project schedule must be provided to IO for approval prior to the implementation of any Work. The Contractor shall consider potential schedule conflicts due to previous or pending commitments to supply services or material to other customers. Anticipated deviations from the schedule must be identified to IO as soon as possible to evaluate the impact of changes on the master project schedule.

12.2 Deliverables Schedule

The Contractor shall provide IO with the documents and data required in the application of this technical specification, the GM3S [AD- 1] and any other requirement derived from the application of the contract.

The schedule below is an estimation, however, the Contractor shall deliver the required data and ultimately the supply scope by the defined need dates.

Deliverable	Description	Estimated due date
D1.1	Kick-off meeting minutes	T0 +3 days
D1.2	Approval of documents related to the “Contract documentation”	T0 + 1 month
D1.3	Approval of documents related to the “Design documentation”	T0 + 6 months

D1.4 (T1)	Approval of the "Qualification documentation"	**Q2 2027**
Completion of Task 1 – Design & Qualification Phase		
Hold Point (T2)	Approval of the "Manufacturing Readiness Review" (Section 7.11)	T1 + 6 months
Completion of Task 2 – Manufacturing Readiness		
D3.1	Completion of the FAT (Section 7.13) Approval of the FAT report	T2 + 12 months
D3.2 (T3)	Approval of the Manufacturing Dossier	T2 + 14 months
Completion of Task 3 – Manufacturing and Testing		
D4.1	IO acceptance of the delivered equipment and handover of the complete approved documentation	T3 + 1 month **Need date 2029**
Completion of Task 4 – Delivery to IO site		

T0 = Commencement Date of the contract

12.3 List of deliverable documentation packages

At the completion of the contract, all the following documents shall be submitted to IO for acceptance.

In addition, when relevant according to the PE/NPE classification defined in [AD- 2], the Contractor shall provide the additional documents listed in Appendix I of [AD- 36].

12.3.1 Contract Documentation – D1.1

- Final technical specification,
- Project Schedule (Appendix II (click here to download) [AD- 1]),
- Quality Plan [AD- 3],
- List of documents,
- Qualification Plan [AD- 30].

12.3.2 Design Documentation – D1.2

- Design/sizing calculation note,
- Hydraulic characteristics,
- Verification and validation of software documents [AD- 9],
- Assembly, 3D models and detail drawings,
- Bill of Materials.

12.3.3 Qualification Documentation – D1.4

- Qualification dossier [AD- 32].

12.3.4 Manufacturing Readiness Documentation – D2.1

- Special process procedures [AD- 12],
- NDT/Inspection personnel certifications,
- Full supplier list [AD- 11],
- Permanent marking and labelling procedures,
- Qualifications of the personnel for manufacturing special processes,
- Manufacturing Inspection Plan [AD- 35],
- Weld maps and weld repair procedures (if applicable),
- Material test reports (Inspection documents),
- Material supplier's quality system certificate,
- Consumable list,
- Qualification Synthesis report [AD- 31],
- Hazard and risk analysis (if ESPN/PED requirement is applicable – refer section 8.3.1).

12.3.5 Factory Acceptance Documentation – D3.1

- FAT report.

12.3.6 Fabrication Documentation – D3.2

- Heat treatment report, including temperature measurement data,
- NDT reports,
- Surface roughness measurement report,
- Inspection report with complete dimensional and tolerance evaluation,
- Certificate of cleanliness,
- List of special tools, if any,
- Hanging/lifting lug load test report,
- ESPN dossier, bilingual English and French (if ESPN/PED requirement is applicable – refer section 8.3.1),
- Deviation requests and non-conformity requests [AD- 10].

12.3.7 Delivery Documentation – D4.1

- Cleaning and packing report,
- Final inspection report,
- Delivery report [AD- 15],
- Packing list [AD- 16],
- Installation, operation and maintenance manual – Instruction manual, bilingual English and French [AD- 38],
- Preservation manual & Qualification Preservation Sheet [AD- 33],
- Reference file [AD- 34],
- Contractor Release Note [AD- 17],
- Photographs of packaged components,
- Any document/drawing/procedure that needs prior approval by the IO as mentioned elsewhere in this specification,
- Manufacturer Declaration of Conformity, bilingual English and French.

13 Delivery

The transport of the items in the scope of supply shall be the responsibility of the Contractor. The selection of the transport company shall be at the contractor's discretion and the Contractor shall be responsible for the transport to the delivery location.

Before the shipment, a Release Note shall be prepared by the "Contractor Release Note" [AD-3][AD- 17] and approved by the IO. Additionally, a native file item-level packing list and a delivery report shall be provided to logistics.data@iter.org by the working instruction for the DRR [AD- 7], at least 15 working days before the planned shipment date for each shipment.

Marking shall be transferred to all pieces when a part is cut to make more than one component. The method of marking and marking procedures shall comply with the document "ITER Numbering System for Components and Parts" [AD- 6]. IO will provide a detailed 'IO component identification standard' together with printed label (QR-code) templates.

Shipment and Delivery will be undertaken using the International Commercial Terms (Incoterms) 2010. The Contractor shall deliver the items in the scope of supply "Delivered At Place" (DAP) to the IO Site:

ITER Organization
Route de Vinon-sur-Verdon CS 90 046
13067 St Paul Lez Durance Cedex France

After packaging, the Contractor shall prepare and submit a Delivery Report [AD- 15] and Packing List [AD- 16] to the IO for review and approval. The Contractor shall sign the Declaration of Integrity and stamp it before submission to the IO. Declaration of Integrity is included in the Delivery Report.

14 Special Management requirements

Requirement for GM3S section 6 [AD- 1] applies in full.

The Contractor and the IO shall meet to review the progress of the work and discuss technical issues.

The Contractor or IO can request specific meetings or communications to resolve issues. All the meetings shall be held by video conference. The Contractor shall be responsible for producing minutes of each meeting, which shall be circulated for review and approval by all attendees before formal issue.

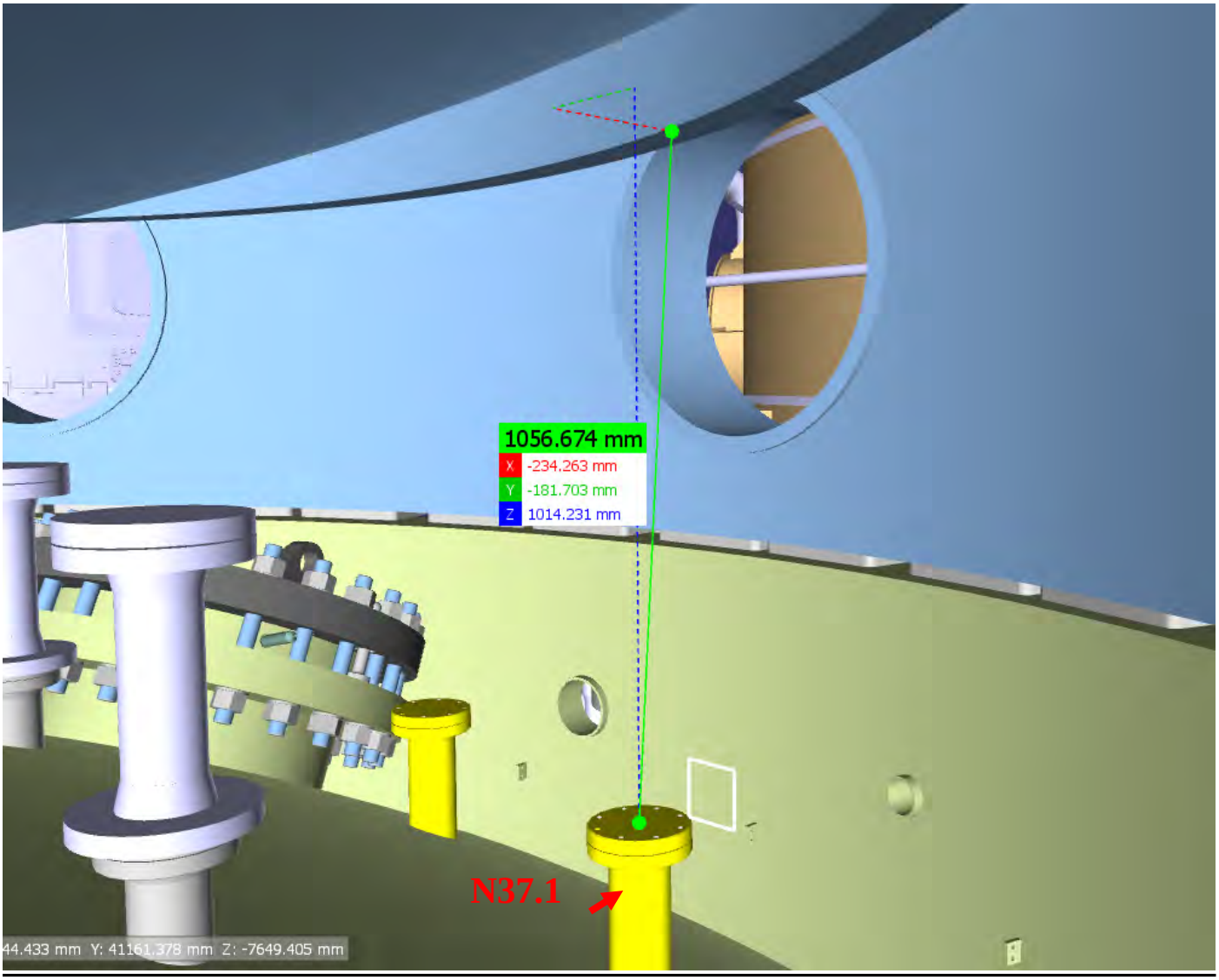
The Contractor shall provide the Deliverables corresponding to the Task assigned by IO in due time. The content of such Deliverables is described in Section 12.2.

In addition to the contract gates as defined in [AD- 1] Section 6.1.5, the scope of work call for Contract gates as defined in Section 12.2 of this document

[APPENDIX1] Installation – preliminary top space availability

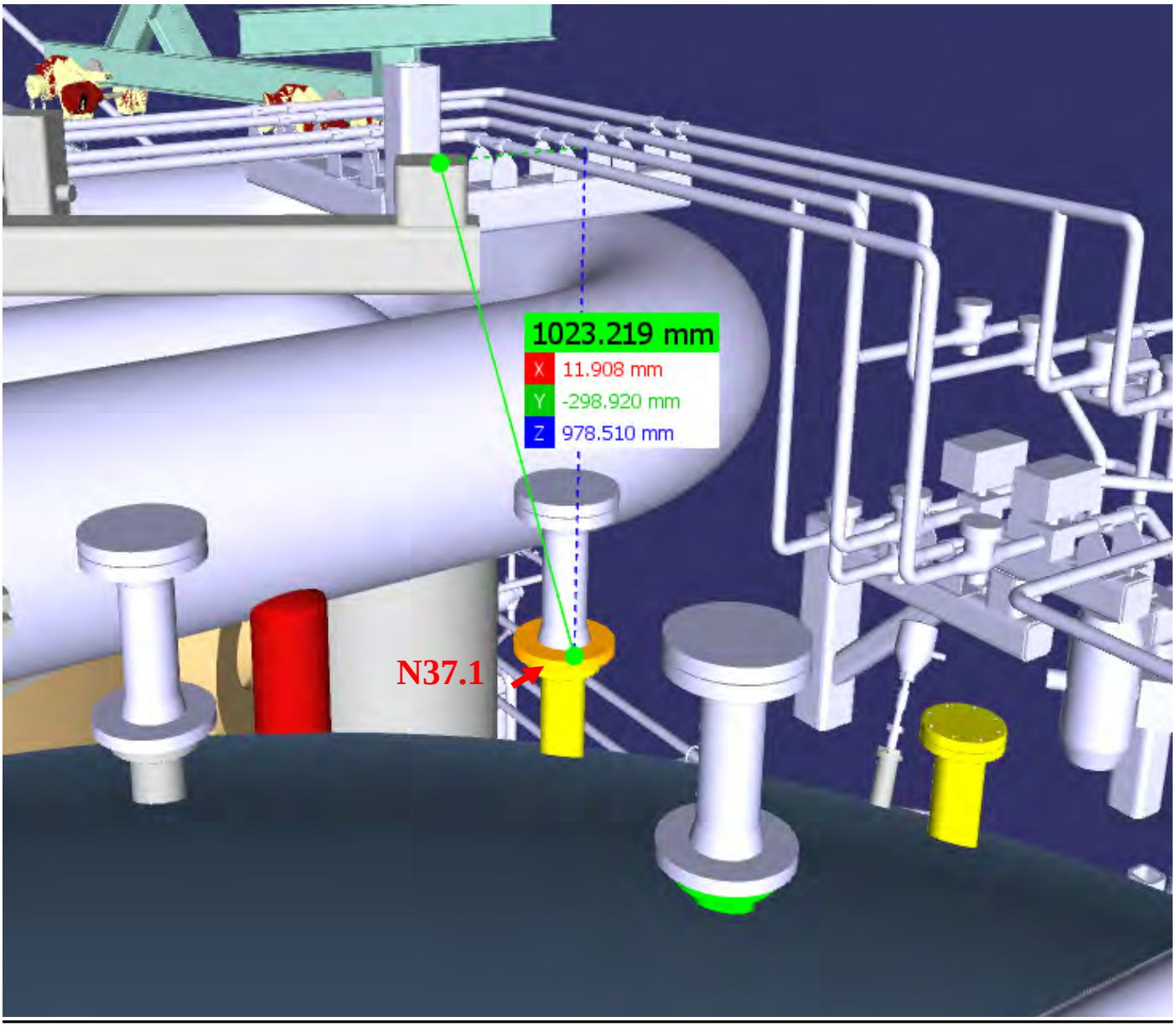
SLT

LLT1 is staked above SLT. The headspace above SLT is limited by LLT1. The installation will be inside the tank skirt, across the skirt manhole (DN800).



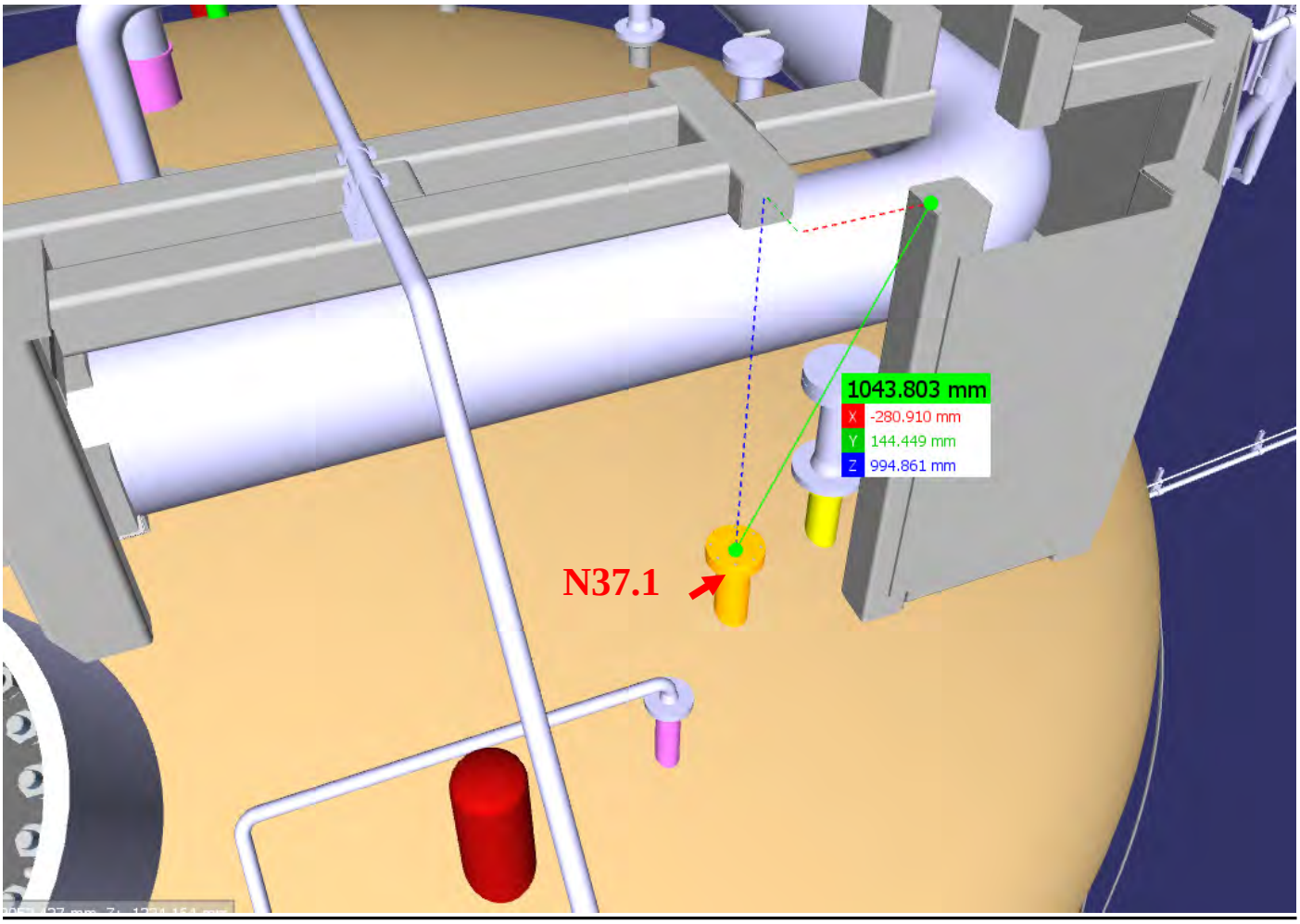
LLT1

LLT1 headspace is located just below the room ceiling.



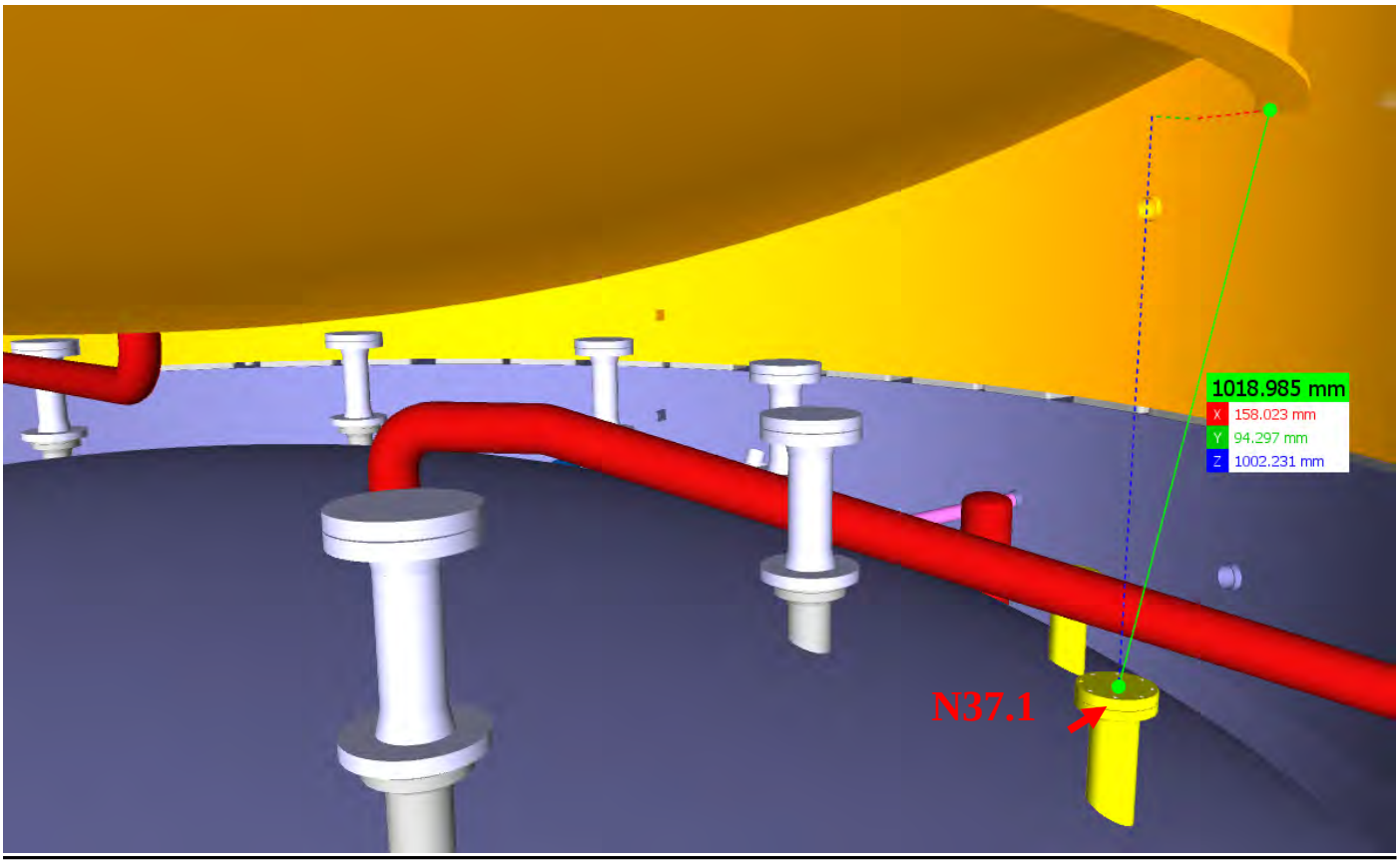
LLT2

LLT2 headspace is located just below the room ceiling.

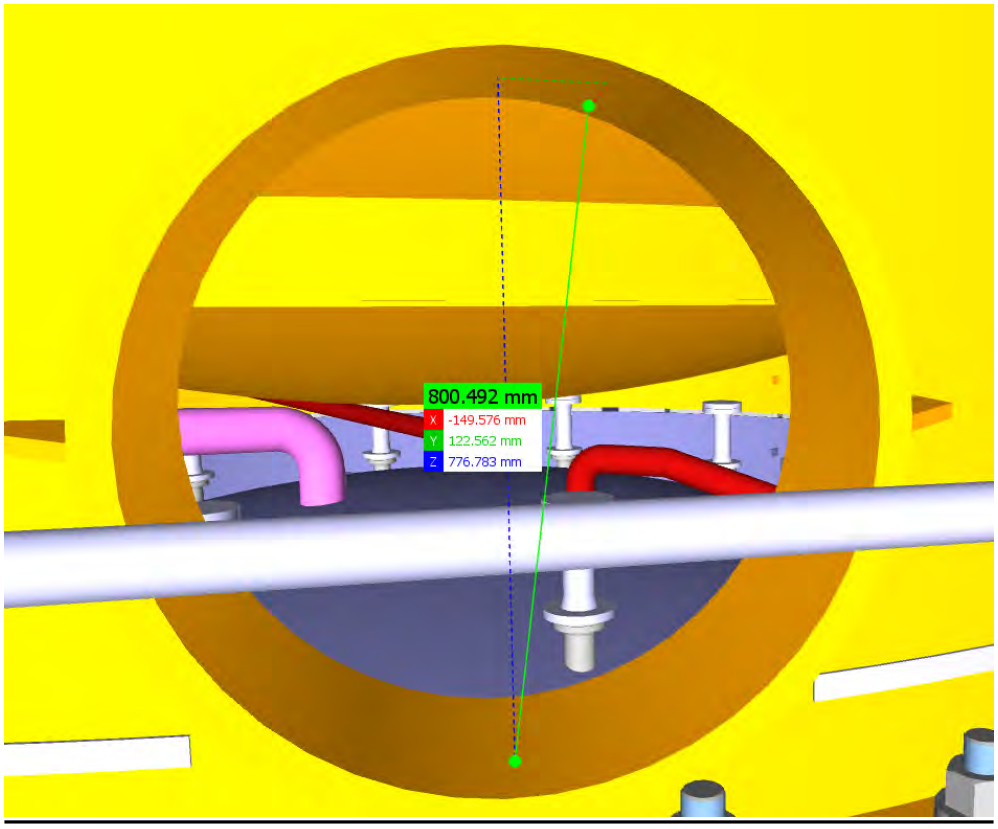


LLT3

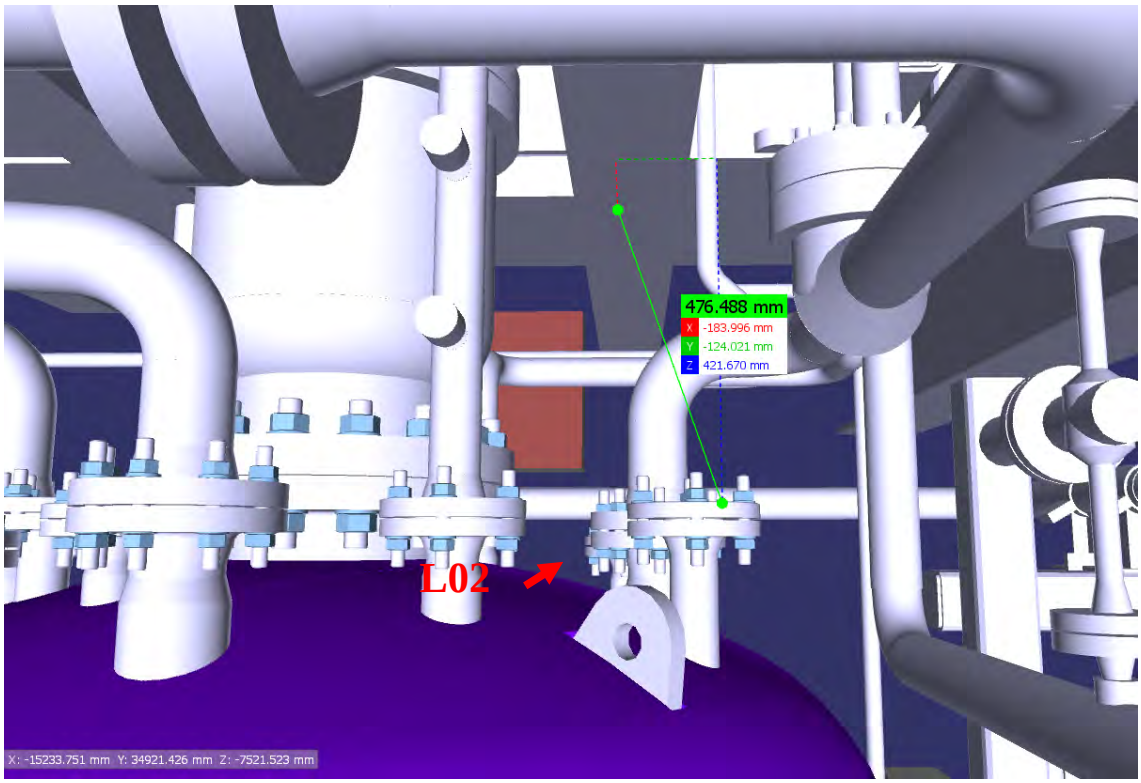
LLT2 is staked above LLT3. The headspace above LLT3 is limited by LLT2. The installation will be inside the tank skirt.

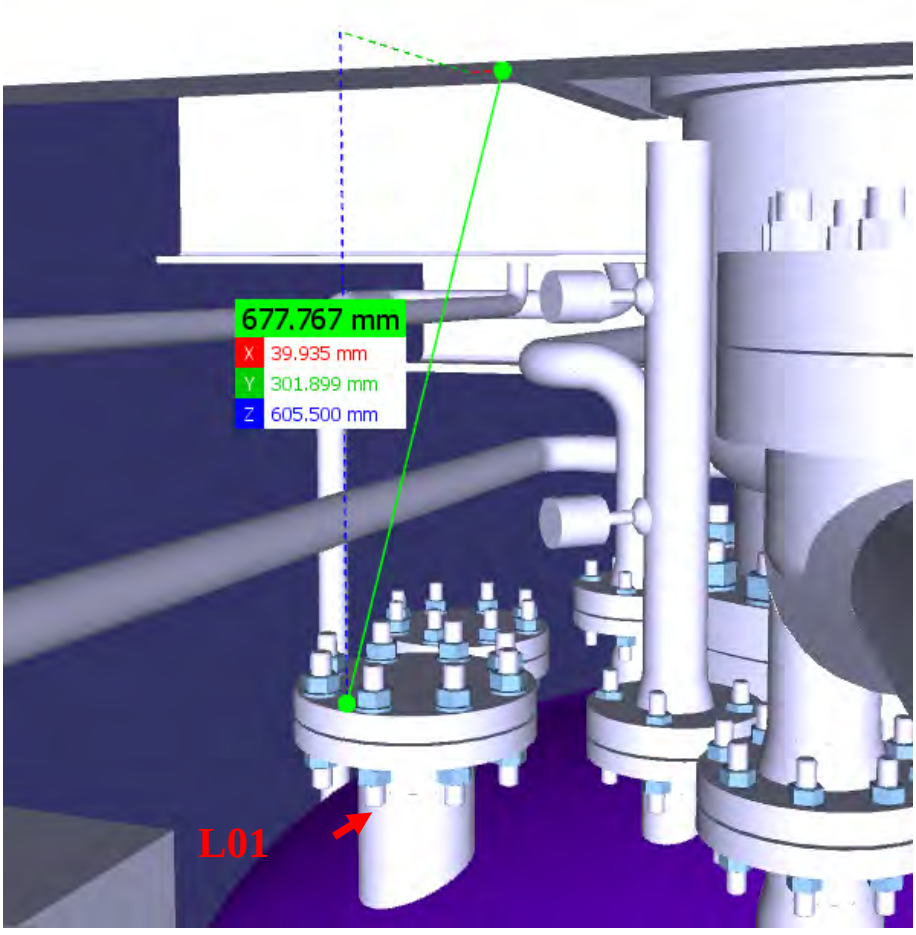


The installation will be performed through the skirt manhole.



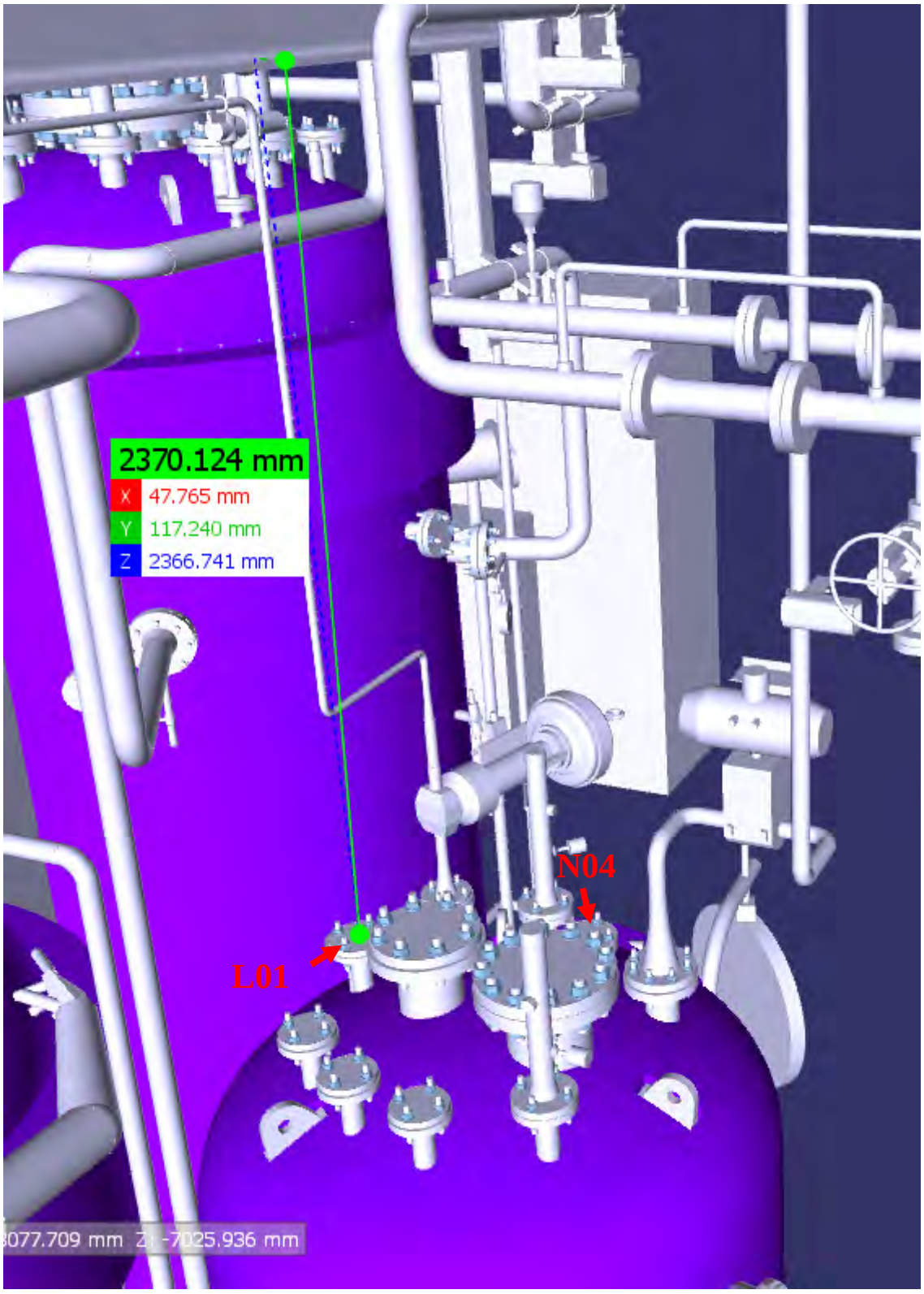
PST


476.488 mm
X -183.996 mm
Y -124.021 mm
Z 421.670 mm
L02
X: -15233.751 mm Y: 34921.426 mm Z: -7521.523 mm


677.767 mm
X 39.935 mm
Y 301.899 mm
Z 605.500 mm
L01

QEN

OFT


2370.124 mm
X 47.765 mm
Y 117.240 mm
Z 2366.741 mm
N04
L01
3077.709 mm Z: -7025.936 mm

Cooler Condenser