



Liberty Pipes (Hartlepool) Ltd - UK Domestic Plate Supply vs European / Other Countries

(1) Introduction

Liberty Pipes Hartlepool (LPH) is a global manufacturer of high specification large diameter longitudinally welded line pipe (LSAW) for the following industrial sectors: oil & gas, renewables, civil and infrastructure and the emerging energy transition segment (hydrogen, CCS, CO₂).

LPH is based in Hartlepool and uses the U-O-E and 3RB manufacturing process to form and weld hot rolled reversing mill plate (HRP) (purchased globally) into API 5L monogrammed line pipe.

LPH employs c260 people (nominally) and has an annual capacity of between 125kT and 400kT per year of output.

Due to the sectors within which LPH operates (predominantly oil & gas), the products required are focused on a small number of standards; namely pipe to **API 5L** or **ISO 3183**. These standards are almost always supplemented by a client specification.

Other products tend to occupy a limited proportion of LPH's capacity (typically 5-10% max by weight), and comprise structural tubular elements, typically manufactured to **BS EN ISO 10210** or **BS EN ISO 10219**.

Due to the demands of the pipe specifications & standards to which LPH must comply and combined with a lack of capability of indigenous UK plate manufactures, LPH feedstock purchases (for the last 30 years) have been supported by and supplied from mainland European manufacturers.

No change in the UK plate rolling capability is envisaged in the short, medium or long term. In order to continue operations and to provide ongoing support to our core client base (within the Oil & Gas and Gas Infrastructure sectors) LPH must retain the ability to secure suitable exceptions to safeguarding quotas and potential tariffs on incoming plate feedstock to prevent a catastrophic impact on the business.

2) UK hot rolled reversing mill plate (HRP)

Historically LPH had access to two HRP mills capable of supporting an element of demand; these mills were located in Scunthorpe and Motherwell (known as Dalzell). Ownership of these facilities has changed over the years (British Steel – Corus – Tata Steel UK). The Scunthorpe facility was closed several years ago (under Tata Steel UK ownership) and was thus no longer being able to supply plate to LPH. Dalzell (Motherwell) was sold to Liberty Steel. Liberty Steel Dalzell remains operational but with a more limited capability when compared with its previous capability/product range.

Another entrant into the UK was Spartan UK Ltd (part of the MetInvest group based in Ukraine), but this facility does not manufacture any plate suitable for line pipe and cannot be considered by LPH.

Liberty Steel Hartlepool

SAW Pipe Mills, Brenda Road, Hartlepool, TS25 2EF, United Kingdom

T: +44 (0) 1429 527 343 **E:** contactus@libertyhg.com

www.libertyhousegroup.com/steel





In summary, neither of the existing HRP manufacturers currently located within the UK are suitable or capable of supplying LPH with the material (HRP) needed to support our ongoing activities and as such an exemption (for certain HRP product types not available from within the UK) is sought to safeguard the future of our business.

Further detail / explanation is provided below:

Liberty Steel Dalzell (LSD):

- HRP for line pipe capability is limited to lower grades and levels of specification, and to moderate thicknesses (>15mm), driven mainly by available rolling technology and the availability and suitability of slab feedstock from either British Steel (Scunthorpe) or on the open market.
- The technological distinctions will be made later in this summary paper. In fact, the Liberty Steel Dalzell website and product catalogue range doesn't even identify API 5L line pipe grades and focuses on other plate standards.
- LSD's HRP capacity for linepipe is also limited and cannot address the rate of consumption that LPH require, which can frequently be in the 3000kt – 8000kt/week range, significantly different from Dalzell's current capacity of c750-1000 kt/week.
- The undeniable position is that even before any technological capability or reputational aspects are considered, UK HRP rolling capability is significantly constrained to the extent that any ability to support LPH is limited to no more than 5% of LPH volume requirements.

3) Technological demands of the line pipe sector

The international oil, gas (and ultimately H₂) sectors all require line pipe that comes with a high degree technological and quality integrity, with demanding properties and an expectation of high performance. This is due to the effects of non-compliance on the environment, and the liabilities/loss of revenue involved in any pipeline failure.

LSAW pipe is ultimately a formed and welded plate; the technological aspects of the pipe come in the main from the plate feedstock.

Therefore, the following aspects need to be addressed:

- **Weldability** – the ability for the pipes to be welded together into a pipeline in a cost-effective way with the required properties in the weld and the heat affected zone of the weld. This is attained through the use of lean and lightly alloyed steel compositions.
- **Resistance to fracture initiation at low temperatures** – the material must be tough enough to resist fracture. This is measured by the attainment of a high level of toughness at low temperatures as measured by the Charpy V notch test. Furthermore, as this test is also conducted on the weld and heat affected zone of the pipe longitudinal seam weld, the same concerns over weldability for those conducting the welding of pipes together into a pipe line applies, and this means the chemical composition is key again.

- Resistance to fracture propagation – while toughness measured via the Charpy V notch test can demonstrate resistance to initiation of a fracture, the steel's ability to resist the growth of any fracture must also be confirmed if required. This is done by a combination of high absorbed energy during the Charpy V notch tests, and by the attainment of required properties during the Battelle Drop Weight Tear Test (BDWTT).
- Pipe (and therefore) plate strength – the most common grades for line pipe steels are X65M and X70M (both grades from the global API 5L standard, which is the de facto 'world standard' for line pipe material). These grades are common as they represent the most acceptable balance of operating pressure, containment integrity and wall thickness cost. Lower strength materials (e.g. X56M and lower as well as ASTM A516 grades) are also important but are in the significant minority.
- Sour service resistance – this is the steels' resistance to hydrogen embrittlement in the presence of H₂S; so called 'sour gas/oil'. This is demonstrated through exposure tests designed to invoke cracking should the steel not be suitable. This behaviour is controlled by having clean steel, with advanced casting technologies and a final microstructure of the steel which has very limited carbides and no pearlitic banding (a metallurgical term). Demand for sour service resistant steels is increasing as operators develop cost effective means of developing these more challenging sources of hydrocarbon – this specific area is core to LPH commercial strategy and long-term aspirations within the Oil & Gas sector.

There are other aspects of suitability, but these are the key aspects that LPH must consider, providing our 'license to operate', without which the impact to LPH could be severe, risking potential business closure and the associated impact on the local community (both directly and indirectly) that business closure would bring.

LSD has an ability to manufacture some of the lower grade/less demanding aspects of certain orders within the line pipe sector, it is unable to attain the required levels of performance in the above areas demanded by many of LPH's clients.

4) LSD capability

Examining the 5 aspects listed above and considering in more detail LSD's capability - it becomes clear why supply potential of LSD to LPH is limited.

In addition, and importantly, we must also look at the configuration of the LSD manufacturing facility and its carbon steel feedstock (Slab).

4.1) Feedstock (Slab).

LSD is predominantly supplied with slab by British Steel.

This slab is produced without the benefit of certain technologies that are expected by LPH Oil & Gas client base; including technologies such as soft reduction, through strand evaluation and advanced QC

Liberty Steel Hartlepool

SAW Pipe Mills, Brenda Road, Hartlepool, TS25 2EF, United Kingdom

T: +44 (0) 1429 527 343 E: contactus@libertyhg.com

www.libertyhousegroup.com/steel



control systems – none of these are available within British Steel). Furthermore, the available choice of steel types from British Steel means that the required compositions necessary to attain the desired weldability, cleanliness and other properties are not available.

4.2) Rolling technology.

In order to meet the required compositions and mechanical properties demanded by LPH clients, an approach to rolling known as thermo-mechanical controlled processing (TMCP) is required to be used for many of the specified standards.

LSD can only lightly apply this technology, limiting the LSD range of application to a very limited span of grades and properties.

In order to produce the required plate, an accelerated cooling system with enhanced roll stand technology is required, which LSD does not currently have. The absence of this equipment, and the lack of availability of suitable composition slab to take advantage of this means that LSD is limited to production of lower grade (e.g. X56M max) material at limited toughness levels (e.g. not below -20°C Charpy V testing in pipe/-40°C in plate and at sub-surface rather than mid-thickness).

4.3) Non-destructive inspection

Another hygiene point for the line pipe industry is the expectation that all plate is able to be 100% of area checked using automated ultrasonic testing. This is usually conducted 'online' (i.e. as part of the standard production process) by LPH's approved European and Other Countries supplier portfolio.

LSD has a very limited capacity for ultrasonic testing, and it is conducted manually (thus not meeting the international expectation of having been conducted in an automatic process).

Regardless that the manual approach is not permitted, Dalzell could not supply at the required delivery rate due to manual nature of their current configuration.

4.4) General surface quality

LSD is able to meet industry standards for structural steelwork and for some of the lower grade/spec requirements of the linepipe market, the attainable surface quality doesn't match what is expected of major projects in the oil and gas sector. This is linked to the composition of the steel that is required by/available to LSD and various aged aspects of the mill configuration/manufacturing asset.

4.5) Thickness capability

Within its range of capability technically, LSD also has some thickness restrictions due to the processing challenges of controlling flatness on thin plates.

LSD is the very definition of a 'heavy' plate mill, and as such, struggles to maintain acceptable flatness at thicknesses <15mm.

The flatness that arises from this thickness of plates can cause significant problems for LSD, either in product compliance or in an inability to process due to risk of ‘cobbling’ (a technical term referring to serious material failure during rolling).

LSD limitations are summarized in the table below and calling on the aspects detailed in 3) above.

Table 1: Summary of LSD limitations

Area	LSD Limitation
Weldability	Due to limited TMCP capability and no accelerated cooling, LSD needs to utilise higher alloyed steel compositions, which ultimately reduce weldability to unacceptable levels.
Fracture Initiation	While LSD is capable of attaining low levels of Charpy toughness down to moderate temperatures (e.g. 40J @ -30°C), many designs call for higher absorbed energies (exceeding 80J/100J in many cases) at temperatures down to -70°C in plate. Furthermore, the tests are frequently asked to be performance at the mid wall area, which LSD would struggle to meet due to excessive centreline segregation from British Steel slab.
Fracture Propagation	While some aspects of propagation are addressed with high joules in the Charpy test (which LSD already struggles to meet), BDWTT is an additional restriction. LSD’s BDWTT capability is limited to attaining -10°C in plate and 0°C in pipe. This capability also reduces markedly as wall thickness increases, with LSD’s limitation being c20mm wall thickness at the uncommon -10°C in plate.
Strength	Strength equates to alloying in many respects; this has already been stated as a concern from a weldability perspective. LSD’s limitations tend to be to grades of c X56M (perhaps X60M), but the ability to offer a specific strength level is tied to being able to offer a suitable chemical composition/alloying level in the steel. Due to this, the max strength tends to be X56M and products where the required weldability matches the offered chemical composition.
Sour Service	This is an area where there is no capability from LSD; this is due to the feedstock being patently unsuitable (insufficiently clean and without the application of required processing technologies) and LSD not having the required cooling equipment to attain the required properties with a much leaner composition in terms of alloying.
End Client Acceptance	A function of lack of experience, capability and surface quality concerns relative to the line pipe market limit LSD’s acceptance within the broad customer base for line pipe material.

In summary – LSD, based on current feedstock arrangements and mill configuration, is limited to and can only be considered by LPH for the supply of basic API 5L X56M PSL2 grades (and lower equivalent), having additional requirements towards the ‘less demanding’ end of client specification requirements, and to structural tubulars/pressure vessel steel in the same ‘less demanding’ area.

Liberty Steel Hartlepool

SAW Pipe Mills, Brenda Road, Hartlepool, TS25 2EF, United Kingdom

T: +44 (0) 1429 527 343 **E:** contactus@libertyhg.com

www.libertyhousegroup.com/steel



This equates to an estimated annual tonnage of c5-10kT in the market sector of 'conductor' pipe used for offshore drilling, and potentially an additional annual 5-10kT max in the structural/process tubulars/pipe sector. Entirely insufficient to support LPH's nominal annual capacity of 125kt – 400kt per annum.

5) Defining products that should be exempt from safeguarding measures.

With the above in mind, it is necessary to define the conditions where LSD is unable to supply LPH with HRP suitable for its needs, and where safeguarding measures would be seen to be detrimental to LPH's future as a business.

Please refer to Appendix 1, Table 2 below.

If any of the criteria listed apply, then Dalzell's ability is either confirmed as insufficient, or the risk is too high.

In most cases, the clients' specification as well as the experience of the pipe mill will determine what the required chemical composition and required plate properties need to be in order to ensure that the pipe meets the final requirements.

If these requirements permit the use of LSD material (which is in LPH's parent company's interest), then supply from LSD can be considered and will be sought.

However, where LSD is not able to deliver (technically or due to schedule), LPH should not be detrimentally affected by any safeguarding measures.

Table 2 is provided predominantly for technical evaluation, but client schedule/manufacturer capacity must also form part of the evaluation.

Finally, the issue of client acceptability (Approved Vendor/Manufacturer Lists) is a key aspect. Without the capability, there is no track record, and oil and gas clients require experience to commit to multi-million-pound projects. Even with an immediate investment programme (unlikely), there would be many years before the experience was developed to convince international oil and gas companies of the pedigree of such a supply chain and as such, irrespective of capability or capacity should LSD not be considered as an approved or acceptable supplier (HRP) then it cannot be considered by LPH.

6) Conclusion

It is LPH's stated intent to utilise LSD HRP wherever possible, due to both being owned by the same company.

However, the vast majority of LPH's requirements are not able to be satisfied by LSD.

Table 2 serves to provide a way to ensure that safeguarding measures are only applicable to HRP that could have been technically supplied by LSD.



LPH's ongoing viability requires it to have access to local (i.e. within the EU) HRP which is approved by its client base.

Any restriction to the choice of where HRP can be sourced, through safeguarding measures designed to protect UK businesses, but where UK businesses are unable to support LPH demand has the potential to be disastrous for LPH.

Please consider this is a formal request for a safeguarding exemption, specifically for those products (HRP) not available to LPH ex UK based manufacturers. LPH and its Directors are available for further discussion and dialogue in this regard, seeking prompt and swift action to protect a business which has been manufacturing carbon steel pipe in Hartlepool for >50 years, directly and indirectly supporting the local (which in recent years having been severely affected by the industrial downturn) and national economy as part of the strategically important steel sector, LPH regularly generating >£100 million per annum in sales revenue and employing 200-250 people whose livelihoods would be at risk should the current safeguarding measures remain in place, as currently defined.

Martin Connolly

Technical Director

Liberty Pipes (Hartlepool) Ltd

Martyn Curnow

Commercial Director

Liberty Pipes (Hartlepool) Ltd

Liberty Steel Hartlepool

SAW Pipe Mills, Brenda Road, Hartlepool, TS25 2EF, United Kingdom

T: +44 (0) 1429 527 343 E: contactus@libertyhg.com

www.libertyhousegroup.com/steel



Appendix 1: Table 2: Criteria for application of safeguarding measures

Is the answer 'yes' to any of these questions?	Is the strength level > X56M equivalent in the as pressed condition?	Product should be exempt from Safeguarding measures
	Is the strength level > X56M equivalent in the simulated post weld heat treated condition?	
	Is the strength level also required to be met in the longitudinal direction?	
	Is the wall thickness < 15mm?	
	Is the delivery rate in excess of 750 tonnes/week?	
	Is the required C from the standard/client specification or to attain required properties in pipe < 0.12%?	
	Is the required S from the standard/client specification or to attain required properties in pipe < 0.003%?	
	Is the required P from the standard/client specification or to attain required properties in pipe < 0.020%?	
	Is the required CEV from the standard/client specification or to attain required properties in pipe < 0.37%?	
	Is the required PCM from the standard/client specification or to attain required properties in pipe < 0.20%?	
	Are Cv properties required in the mid wall area?	
	Is the required Cv energy > 40J in the transverse direction?	
	Is the required transverse Cv test temperature in plate < -30°C?	
	Is BDWTT performance required at < -10°C in plate?	
	Is BDWTT performance required in plate between -10°C and 0°C and the wall thickness exceeds 20.0mm?	
	Is NDT via an automated AUT standard required?	
	Are sour service properties required?	
	Are alloy steel grades such as ASTM A387/A387M required?	
	Does the end client specify or restrict supply of HRP to manufacturers (excluding LSD)?	