

Copy of engine Contract for Carels engine at Goyt Mill, Marple

June 26th 1906

General Description

One Carels horizontal condensing steam engine, cross compound type with intermediate receiver. Fitted with drop valve motion giving a variable cut-off in the HP cylinder controlled by the governor. Fixed cut-off in the LP cylinder with jet condenser

Dimensions

The engine shall be constructed of the following principal dimensions, which we guarantee to be sufficient to produce the specified result:-

Diameter of HP cylinder	925mm (36½ ins)
Diameter of LP cylinder	1600mm (63ins)
Length of stroke	1600mm (63ins)
Diameter of piston rod	180mm (7⅛ ins)
Speed	70 revs per minute
Weight of engine without flywheel	118 tons
Approximate weight of wheel	66 tons
Diameter of flywheel	24ft 9in
The flywheel rope grooves	54 ropes 1½ ins diameter

Power

The engine shall be capable of developing 2100 IHP at normal load and 2500ihp at maximum load with an initial steam pressure of 150 lbs per sq inch, superheated at 575 Deg F in the HP cylinder and with a cut-off giving an admission not exceeding 1/12 for normal load and 1/9 at maximum load. Of the volume of the low pressure cylinder under these conditions the LP cylinder will utilise the whole of the steam exhausted from the HP cylinder.

Steam Consumption

The steam consumption shall be obtained by running under normal conditions, clearance of jackets included, but exclusive of the water condensed in the steam pipe up to the stop valve, the temperature of the injection water not exceeding 80 Deg F

Guarantee of Efficiency

The efficiency of the engine shall be 92 % at 2100 IHP. The engine, when running without load shall absorb no more than 160 IHP. We guarantee that under the above conditions of speed and initial pressure the steam consumption per IHP per hour shall not exceed the following (with superheated steam at 575 degF) :-

When working at	1600 IHP	10.25 lbs/ihp/hr
	2100 IHP	10.00 lbs/ihp/hr
	2500 IHP	10.25 lbs/ihp/hr

For the first full half pound of steam consumed beyond that guaranteed per IHP per hour, the builders shall be liable to pay a fine of £500 by way of liquidated damages

Price

The price of this engine, including the extra named items further on is £7700 net cash without discount, delivered and erected on the site of the company's buildings at *Goyt Mill, Marple*

Guarantee

We undertake to replace any part which shall be found to be defective or improperly mounted on condition that the engine shall be erected by ourselves. In such case, we shall replace at our expense (but without prejudice to either party) for a period of one year - for engines running during the day, or for a period of 6 months - for engines running night & day, dating from the day of starting.

For all parts which may become broken or worn, in the cases where it shall be proved that the damage has arisen in consequence of overloading, imprudence, neglect or from "force majeure", the expense of the repairs shall be borne by the purchaser.

It is agreed that Carels Freres shall not be liable for consequential damages

Steam Jacket

The jacket of the low-pressure cylinder shall be heated by the steam coming from the high-pressure cylinder. The means adopted for the admission of the steam into the jacket and for the ejection of the condensed steam shall be arranged so as to ensure their perfect working

Lagging

The HP cylinder, receiver and the steam jackets of the LP cylinder shall be lagged with non-conducting material and covered with planished steel sheeting

Materials

All materials used shall be of the finest quality and absolutely without defect

The crosshead guides and the flanged ends of the bedplates are accurately bored and faced at the same setting, by which means a perfect alignment of the axes of cylinder and crosshead is obtained giving to the latter a stability and accuracy which cannot be obtained with planed surfaces.

The cylinders, piston rings, valves and valve castings are cast of specially prepared tough metal. All pin joints in the valve motion are fitted with gun-metal bushes carefully ground to size.

The shafts, connecting rods, cranks, crossheads, piston rods, crank and crosshead pins, are made of the best mild steel.

The connecting rod ends are constructed according to designs specially adopted by ourselves facilitating the adjustment of the brasses and allowing of very rapid uncoupling for periodical inspection of the pins.

The bearings of the crankshaft are of cast steel lined with Babbitt's anti-friction metal

All the steam joints of the cylinder are scraped and ground so as to be perfectly steam-tight without the use of any jointing material

Working conditions

Under all or any variations of load, the engine shall run without knock, vibration or sensible heating and in particular we undertake that not the slightest knock shall be allowed in the pistons, connecting rods, cranks or bearings, nor in any part of the valve-gear mechanism.

The engine shall run with perfect regularity and its speed shall not increase more than 3% from full load to no load with the stop valve wide open, after a period of regulation of 25 seconds

Accessories

This tender is for the engine complete with all piping required for the engine, beginning with the stop valve and ending with the overflow of the condenser. Also a flywheel barring machine, highly polished steel handrails (with supporting columns) around the flywheel and other exposed parts.

Mountings and all necessary accessories, such as foundation bolts, plates and automatic lubricators, cylinder cocks and steam traps, relief valves, pressure and vacuum gauges, set of spanners, indicator cocks and gear, duplex metallic packings for stuffing boxes.

The engine shall be painted ready to receive the last coat. All visible parts of metal shall be polished and generally all parts shall be perfectly finished.

The expenses of masonry and foundation work, woodwork, steam and exhaust piping, circulating water supply and discharge shall be borne by the purchaser.

Erection

We agree to provide a fitter to erect the engine and to provide the necessary unskilled labour and all scaffolding and tackle required. The purchaser to provide an overhead crane in the engine-room and to leave sufficient opening in the engine-room for the parts to enter and unload under the crane.

Testing

A test in duplicate on two successive days to be made six months after the engine has started work, in the presence of the builder's engineers, by the Manchester Steam Users Association, whose report thereon shall be conclusive. Any excess in charge above £50 for the tests and for the preparations for the same shall be paid by the purchaser.

Prices

The following are also included in the contract price of £7,700

Revolution counter	£10
Moscrop recorder	£34
Casing for flywheel	£150
Latest improved indicator with planimeter	£25
Steam piping in engine room	£340
Cost of steam test by independent expert	£50
Total	£609