

The replica HSM 814

The original: the 4-4-4 Tank locomotives Nos. 806-812 of the HSM

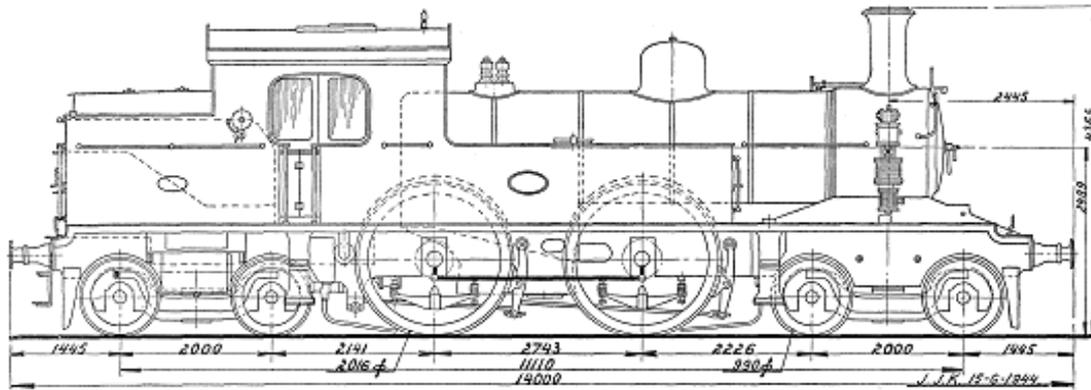
In 1914 and 1915 Werkspoor supplied the last and largest tanklocomotives to the Hollandsche IJzeren Spoorweg Maatschappij (Holland Iron Railway Company) HYSM or HSM. The 4-4-4 tank locomotives of the series 800-812 were used by HSM for commuter trains on the lines from Amsterdam to Enkhuizen, Haarlem and Hilversum. It was a slightly larger development of the 4-4-2 series 771-776 by adding an extra axle to form a rear bogie. The 771-776 themselves were a development from the 4-4-2 series 771-775 by applying superheating. This was done by equipping the boiler with flues and heater elements and the cylinder block with piston valves instead of slide valves. As a result, the boiler was located higher above the frame. The boilers themselves were interchangeable with those of the series HSM 350 to 408, with loose tender, while there was a further standardization through the use of almost the same firebox for the 4-4-0 Series 350, the 4-4-0 421, the 0-6-0 601 and 0-6-0 671, the 4-4-2 701, 771 and 4-4-0 800, respectively NS series 1600,1900, 3200, 3300, 5500, 5700 and 5800.

Due to the extensive electrification of the railnet around the Amsterdam the 800's were disposed of as NS 5800's between 1945 and 1951 after 35 years of service.

The main dimensions were:

Heated surface firebox	10 m ²
Heated surface flues and tubes	71 m ²
Superheater heated surface	23 m ²
Grate area	2.04 m ²
Maximum steam pressure	10.5 bar
Number of cylinders	2
Diameter cylinders	500 mm
Stroke	660 mm
Steam Distribution:	Stephenson
Diameter main driving wheels	2016 mm
Water amount	9.5 m ³
Coal space	5 tonnes
Locomotive weight (empty)	58.6 tons
Locomotive weight (service)	77.4 tons
Total length over buffers	14120 mm
Largest permissible speed	100 km / h
Pulling force	6030 kg
Built by Werkspoor,	Nos. 378-384.
Year of commissioning	1915.

The locomotives were equipped with a Westinghouse brake, a steam heating system forward and aft, a preheater system "Knorr" with a area of 9.2 m² V.O. and a leftside pump with a yield of 120 liter / min.



1915
Tenderlocomotieven met oververhitter, nos 806-812. Schaal 1 à 60.

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The proposal for a replica of a NS mainline railway locomotive focuses on this model. A tank locomotive requires no additional infrastructure, such as turntables, railway triangles, etc., at the endpoints. The advantage of this 4-4-4 embodiment is that its weight is limited to about 60 tons, the next option, a straightforward 4-6-4 NS 6000 weighs an additional 20 tonnes, and is therefore about one-third more expensive in building costs.

Considerations:

The locomotive is a representative of the large series of tanklocomotives that the Netherlands has known and have given their proven service for years in the commuter traffic.

The locomotive represents a model which was designed in the Netherlands itself and manufactured by Werkspoor. As such a replica is a continuation of a very old tradition.

The design of the locomotive is still clearly based on the original British style of the HSM locomotives and as such iconic for tanklocomotives

The replica has a role to play in the present stride to raise interest in manufacturing techniques.

The locomotive can be rented out and be used for travels by others.

The locomotive will be executed in the implementation of the HSM, without preheater and HSM number 814. Perhaps it will carry a different wine red color coating with extra brass ornaments at a jubilee.

The technical implementation will conform to the current rules for application of pressure vessels and will meet the requirements for admission to the Railway network.

Because the replica must keep up properly with the present traffic, a speed of 120 km / h is requested. The original requirement for the train weight seems to have been 300 ton, in any case it was, according to Karskens, the authorized train weight of the locomotives with separate tender of the HSM series 421-460. However, that was at a speed of 90 km / h.

In the Appendix: HSM814 B (calculations) with the locomotive performance calculated at various speeds from 90 km / h to 120 km / h with a 2 cylinder type 4-6-0 with a train of 400 tons. The data can be compared with tested locomotives. The reports of British Railways on the tests with the LNER B1 (Bulletin 2) and that of the BR standard class 4 (Bulletin 3) allow the required amounts of steam and the heat content therein to be determined. The design of the boiler of a locomotive with approximately 300 tons of train weight and 120 km / h can be based on this.

The starting point of the replica is the original, however, all improvements to steam locomotives during the 20th century are taken in consideration. These can then be:

- increased superheating as it came into existence around 1940. For the boiler calculations see Appendix C HSM814 (Boiler)
- shortened channels between the steam chest and cylinders such as the 3700/6100 also received, see Appendix D HSM 814 (valves)
- the long lap-long travel valves as were applied from 1925 onwards systematically in England: same Appendix
- an improved exhaust such as used by Chapelon, Lemaître, Giesl- Gieslingen and Porta applied see Appendix E HSM 814 (chimney)

- The performance of the locomotive is calculated in Appendix F
- Some details of the construction are treated in sequence in Appendix G. It also includes the weight calculation

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