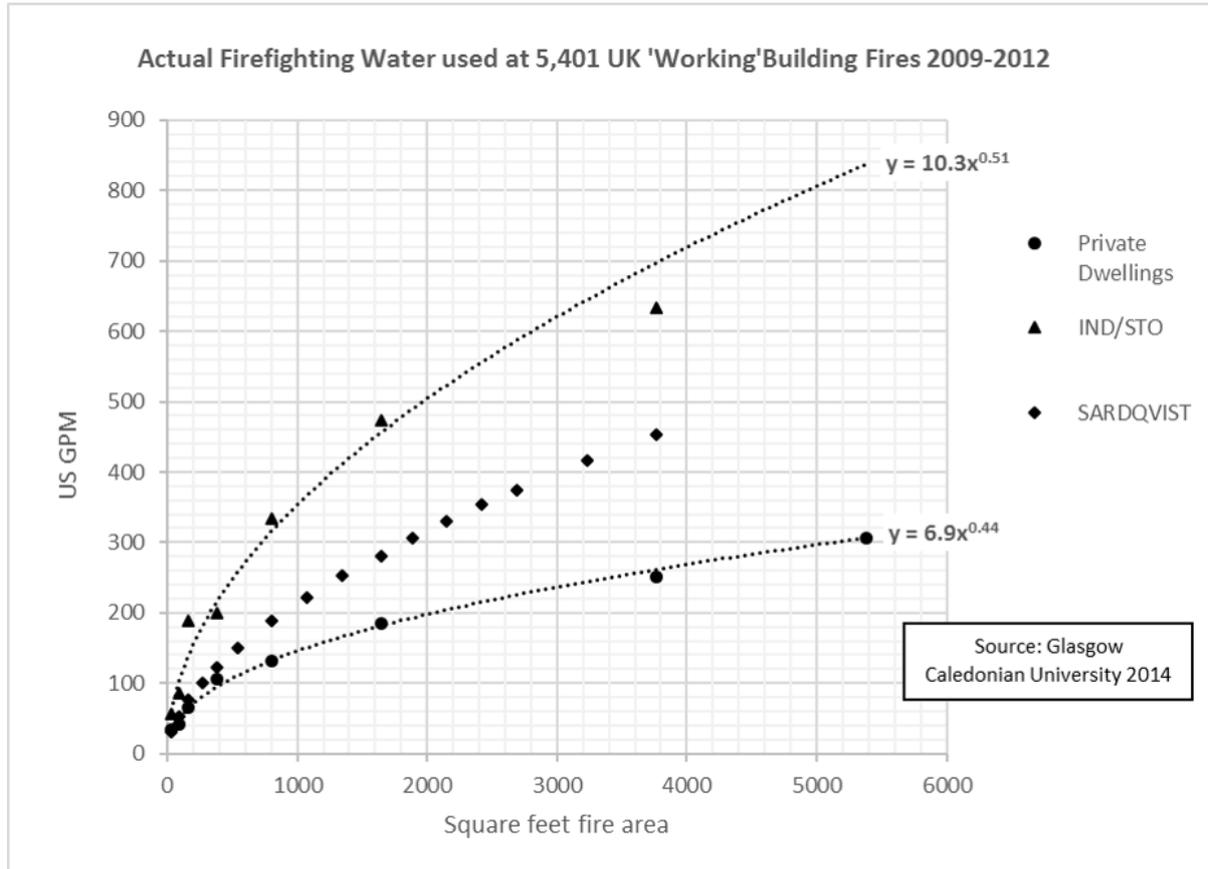


Firefighting Water Flow-rates Research

The Glasgow Caledonian University (GCU) research (author's PhD), analysed Incident Recording System (IRS) data and real time water-smart flow metered data, collated directly from the two fire-grounds of a **county**, and a city **metro**, fire service across 5,401 serious (working) building fires in the UK occurring over a three-year period 2009-2012. The lower line represents residential dwellings and the upper line represent warehouses and factories. All other occupancies fall between these two lines.



This highly concentrated study determined that building fires rarely reached or exceeded a maximum of 5,400 square feet of fire damaged floor area, where the **average fire sizes** of >5,000 'working' building fires ranged between 172 sq.ft of floor area for residential dwellings up to 1,022 sq.ft for industrial units, with all other building and occupancy types falling somewhere in between. It was noted that once fires had burned beyond 5,400 sq.ft of floor space, the buildings were generally lost completely. 66% of **all** working building fires in the GCU research were extinguished using just the 475 gallons of water carried on a single fire engine.

It is estimated that a 20-25MW fire is probably the maximum fire intensity a single 150 gpm hand-held hose-line can deal with. Where sprinklers are not installed in such situations the fire service are quite often helpless in containing such rapid fire-growth. A fire commander needs to be able to immediately estimate fire-ground water requirements with some reasonable accuracy using simple rule-of-thumb guides. A 'rule of thumb' rough fire-ground calculation derived from this UK research is –

Square feet of fire (take the last digit off) and then add 100 = required gpm, so;

- **200 Sq.ft of fire** = **20 + 100** = **120 gpm**
- **3500 Sq.ft of fire** = **350 + 100** = **450 gpm**