What are the «acceptable» THD values for not filtering?

The situation to be avoided is the triggering of resonance conditions between the power factor correction system (equivalent capacitance of the capacitors) and the equivalent inductance of the network.
An expression that gives an idea of the harmonic order that can cause resonance problems is as follows:

$$Or = \sqrt{\frac{An * 100 / Vcc\%}{Qr}}$$

In which:

- An is the rated power of the transformer, expressed in the plant in kVA;
- Vcc% is the short-circuit voltage of the transformer;
- Qr is the power factor correction system in kVAR (not only the maximum but also the different combinations, or steps).

For example, for An=1000 kVA, Vcc%=6 and Qr= 350 kVAR we have:

$$Or = \sqrt{\frac{1000 * 100 / 6}{350}}$$

$$Or = 6{,}9$$

Therefore, in proximity to harmonics of order 7, resonance phenomena are triggered with resulting intolerable values both in current and in voltage which not only cause damage to the power factor correction system but can also cause considerable disservices for the entire plant.
In this case, the only viable solution is the use of detuning inductances inside the power factor correction system.
The table below represents a rough indication of our suitable series based on the value of THDi (Total Current Harmonic Distortion), having however excluded the triggering of resonance phenomena.