

Selection step	$2\ell\text{ss} + 0\tau_{\text{h}}$	$2\ell\text{ss} + 1\tau_{\text{h}}$
Targeted $t\bar{t}H$ decay	$t \rightarrow b\ell\nu, t \rightarrow bqq'$ with $H \rightarrow WW \rightarrow \ell\nu qq'$	$t \rightarrow b\ell\nu, t \rightarrow bqq'$ with $H \rightarrow \tau\tau \rightarrow \ell\nu\nu\tau_{\text{h}}\nu$
Targeted tH decays	$t \rightarrow b\ell\nu,$ $H \rightarrow WW \rightarrow \ell\nu qq$	$t \rightarrow b\ell\nu,$ $H \rightarrow \tau\tau \rightarrow \ell\tau_{\text{h}} + \nu's$
Trigger	Single- and double-lepton triggers	
Lepton p_{T}	$p_{\text{T}} > 25 / 15 \text{ GeV}$	$p_{\text{T}} > 25 / 15 \text{ GeV (e) or } 10 \text{ GeV } (\mu)$
Lepton η	$ \eta < 2.5 \text{ (e) or } 2.4 (\mu)$	
$\tau_{\text{h}} p_{\text{T}}$	—	$p_{\text{T}} > 20 \text{ GeV}$
$\tau_{\text{h}} \eta$	—	$ \eta < 2.3$
τ_{h} identification	—	very-loose
Charge requirements	2 same-sign leptons and charge quality requirements	2 same-sign leptons and charge quality requirements $\sum_{\ell, \tau_{\text{h}}} q = \pm 1$
Multiplicity of central jets	≥ 3 jets	≥ 3 jets
b tagging requirements	≥ 1 tight b-tagged jet or ≥ 2 loose b-tagged jets	≥ 2 loose b-tagged jets
Missing transverse momentum	$L_{\text{D}} > 30 \text{ GeV}^{\dagger}$	
Dilepton invariant mass	$ m_{\ell\ell} - m_{\text{Z}} > 10 \text{ GeV}^{\ddagger}$ and $m_{\ell\ell} > 12 \text{ GeV}$	

Selection step	$3\ell + 0\tau_{\text{h}}$	$3\ell + 1\tau_{\text{h}}$
Targeted $t\bar{t}H$ decays	$t \rightarrow b\ell\nu, t \rightarrow b\ell\nu$ with $H \rightarrow WW \rightarrow \ell\nu qq'$ $t \rightarrow b\ell\nu, t \rightarrow bqq'$ with $H \rightarrow WW \rightarrow \ell\nu\ell\nu$ $t \rightarrow b\ell\nu, t \rightarrow bqq'$ with $H \rightarrow ZZ \rightarrow \ell\ell qq' \text{ or } \ell\ell\nu\nu$	$t \rightarrow b\ell\nu, t \rightarrow b\ell\nu$ with $H \rightarrow \tau\tau \rightarrow \ell\nu\nu\tau_{\text{h}}\nu$
Targeted tH decays	$t \rightarrow b\ell\nu, H \rightarrow WW \rightarrow \ell\nu\ell\nu$	—
Trigger	Single-, double- and triple-lepton triggers	
Lepton p_{T}	$p_{\text{T}} > 25 / 15 / 10 \text{ GeV}$	
Lepton η	$ \eta < 2.5 \text{ (e) or } 2.4 (\mu)$	
$\tau_{\text{h}} p_{\text{T}}$	—	$p_{\text{T}} > 20 \text{ GeV}$
$\tau_{\text{h}} \eta$	—	$ \eta < 2.3$
τ_{h} identification	—	very-loose
Charge requirements	$\sum_{\ell} q = \pm 1$	$\sum_{\ell, \tau_{\text{h}}} q = 0$
Multiplicity of central jets	≥ 2 jets	≥ 2 jets
b tagging requirements	≥ 1 tight b-tagged jet or ≥ 2 loose b-tagged jets	≥ 2 loose b-tagged jets
Missing transverse momentum	$L_{\text{D}} > 0 / 30 / 45 \text{ GeV}^{\ddagger}$	
Dilepton invariant mass	$m_{\ell\ell} > 12 \text{ GeV}$ and $ m_{\ell\ell} - m_{\text{Z}} > 10 \text{ GeV}^{\S}$	
Four-lepton invariant mass	$m_{4\ell} > 140 \text{ GeV}^{\P}$	—

[†] See text for a complete description of this requirement.

[‡] Applied to all SFOS lepton pairs and to pairs of electrons of SS charge.

[§] Applied to all SFOS lepton pairs.

[¶] If the event contains two SFOS pairs of leptons that pass the loose lepton selection criteria.