

Selection	$2lss$	$2lss + 1\tau_h$
Targeted $t\bar{t}H$ decay	$t \rightarrow blv, t \rightarrow bq\bar{q},$ $H \rightarrow WW \rightarrow l\nu q\bar{q}$	$t \rightarrow blv, t \rightarrow bq\bar{q},$ $H \rightarrow \tau\tau \rightarrow \ell\tau_h + \nu's$
Trigger	Single- and double-lepton triggers	
Lepton p_T	$p_T > 25 / 15 \text{ GeV}$	$p_T > 25 / 15 \text{ (e) or } 10 \text{ GeV } (\mu)$
$\tau_h p_T$	—	$p_T > 20 \text{ GeV}$
Charge requirements	2 same-sign leptons and charge quality requirements	2 same-sign leptons and charge quality requirements $\sum_{\ell, \tau_h} q = \pm 1$
Jet multiplicity	≥ 4 jets	≥ 3 jets
b tagging requirements	≥ 1 tight b-tagged jet or ≥ 2 loose b-tagged jets	
Missing transverse momentum	$L_D > 30 \text{ GeV}$	$L_D > 30 \text{ GeV}^*$
Dilepton mass	$m_{\ell\ell} > 12 \text{ GeV}$ and $ m_{ee} - m_Z > 10 \text{ GeV}^*$	

Selection	$3l$	$3l + 1\tau_h$
Targeted $t\bar{t}H$ decays	$t \rightarrow blv, t \rightarrow bl\nu,$ $H \rightarrow WW \rightarrow l\nu q\bar{q}$ $t \rightarrow blv, t \rightarrow bq\bar{q},$ $H \rightarrow WW \rightarrow l\nu l\nu$ $t \rightarrow blv, t \rightarrow bq\bar{q},$ $H \rightarrow ZZ \rightarrow \ell l q\bar{q}$ or $\ell l \nu\nu$	$t \rightarrow blv, t \rightarrow bl\nu,$ $H \rightarrow \tau\tau \rightarrow \ell\tau_h + \nu's$
Trigger	Single-, double- and triple-lepton triggers	
Lepton p_T	$p_T > 25 / 15 / 15 \text{ GeV}$	$p_T > 20 / 10 / 10 \text{ GeV}$
$\tau_h p_T$	—	$p_T > 20 \text{ GeV}$
Charge requirements	$\sum_{\ell} q = \pm 1$	$\sum_{\ell, \tau_h} q = 0$
Jet multiplicity	≥ 2 jets	
b tagging requirements	≥ 1 tight b-tagged jet or ≥ 2 loose b-tagged jets	
Missing transverse momentum	No requirement if $N_j \geq 4$ $L_D > 45 \text{ GeV}^\dagger$ $L_D > 30 \text{ GeV}$ otherwise	
Dilepton mass	$m_{\ell\ell} > 12 \text{ GeV}$ and $ m_{\ell\ell} - m_Z > 10 \text{ GeV}^\ddagger$	

* Applied only if both leptons are electrons.

† If the event contains a SFOS lepton pair and $N_j \leq 3$.

‡ Applied to all SFOS lepton pairs.