

Selection	$2lss$	$2lss + 1\tau_h$
Targeted $t\bar{t}H$ decays	$t \rightarrow b\ell\nu, t \rightarrow bqq,$ $H \rightarrow WW \rightarrow \ell\nu qq$	$t \rightarrow b\ell\nu, t \rightarrow bqq,$ $H \rightarrow \tau\tau \rightarrow \ell\tau_h + \nu's$
Trigger	Single- or double-lepton triggers	
Lepton multiplicity	Exactly 2 leptons	
Lepton $p_T$	$p_T > 25 / 15 \text{ GeV}$	$p_T > 25 / 15 \text{ (e) or } 10 \text{ GeV (}\mu\text{)}$
Lepton $\eta$	$ \eta  < 2.5 \text{ (e) or } 2.4 \text{ (}\mu\text{)}$	
$\tau_h$ multiplicity	No $\tau_h$ (loose WP)	$\geq 1 \tau_h$ (loose WP) and $< 2\tau_h$ (medium WP)
$\tau_h p_T$	—	$p_T > 20 \text{ GeV}$
$\tau_h \eta$	—	$ \eta  < 2.3$
Charge requirements	2 same-sign leptons and charge quality requirements	
		$\sum_{\ell, \tau_h} q = \pm 1$
Jet multiplicity	$\geq 4$ jets	$\geq 3$ jets
b tagging requirements	$\geq 1$ tight b-tagged jet or $\geq 2$ loose b-tagged jets	
Missing transverse momentum	$L_D > 30 \text{ GeV}^{**}$	
Dilepton mass	$m_{\ell\ell} > 12 \text{ GeV}^*$ and $ m_{ee} - m_Z  > 10 \text{ GeV}^{**}$	

Selection	$1\ell + 2\tau_h$	$2\ell + 2\tau_h$
Targeted $t\bar{t}H$ decays	$t \rightarrow b\ell\nu, t \rightarrow bqq,$ $H \rightarrow \tau\tau \rightarrow \tau_h\tau_h + \nu's$	$t \rightarrow b\ell\nu, t \rightarrow b\ell\nu,$ $H \rightarrow \tau\tau \rightarrow \tau_h\tau_h + \nu's$
Trigger	Single-lepton or lepton+ $\tau_h$ triggers	Single-, double-lepton triggers
Lepton multiplicity	Exactly 1 lepton	$\geq 2$ leptons
Lepton $p_T$	$p_T > 25 \text{ (e) or } 20 \text{ GeV (}\mu\text{)}$	$p_T > 25 / 15 \text{ (e) or } 10 \text{ GeV (}\mu\text{)}$
Lepton $\eta$	$ \eta  < 2.1$	$ \eta  < 2.5 \text{ (e) or } 2.4 \text{ (}\mu\text{)}$
$\tau_h$ multiplicity	$\geq 2 \tau_h$ (medium WP)	
$\tau_h p_T$	$p_T > 30 / 20 \text{ GeV}$	$p_T > 20 \text{ GeV}$
$\tau_h \eta$	$ \eta  < 2.3$	$ \eta  < 2.3$
Charge requirements	$\sum_{\tau_h} q = 0$	$\sum_{\ell, \tau_h} q = 0$
Jet multiplicity	$\geq 3$ jets	$\geq 2$ jets
b tagging requirements	$\geq 1$ tight b-tagged jet or $\geq 2$ loose b-tagged jets	
Missing transverse momentum	—	No requirement if $N_j \geq 4$ $L_D > 45 \text{ GeV}^+$
Dilepton mass	—	$L_D > 30 \text{ GeV}$ otherwise
	$m_{\ell\ell} > 12 \text{ GeV}^*$	

\* Applied on all pairs of leptons that pass loose selection.

\*\* If both leptons are electrons.

† If the event contains a same-flavor opposite-sign lepton pair and  $N_j \leq 3$ .